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BRITISH AND FOREIGN.

EDITED BY

JAMES BRITTEN, K.S.G., F.L.S.

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BRITISH AND FOREIGN

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JAMES BRITTEN, K.S.G., F.L.S.

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The Journal of Botany was established in 1863 by Dr. Seemann. In 1872 the editorship was assumed by the late Dr. Trimen, who, assisted during part of the time by Mr. J. G. Baker and Mr. Spencer Moore, carried it on until the end of 1879, when he left England for Ceylon. Since then it has been in the hands of the present Editor.

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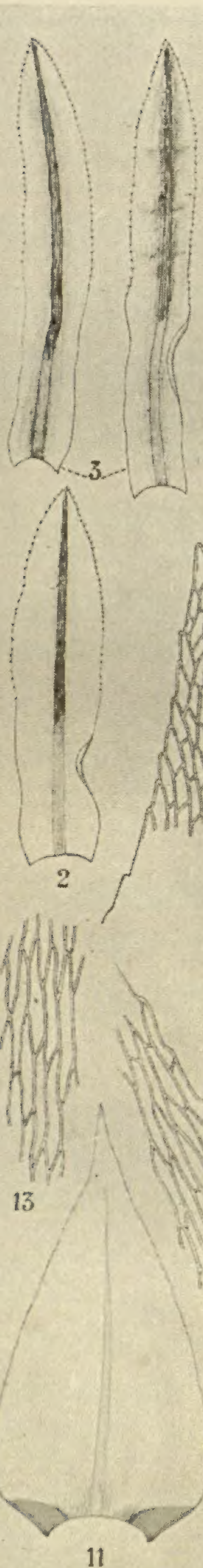
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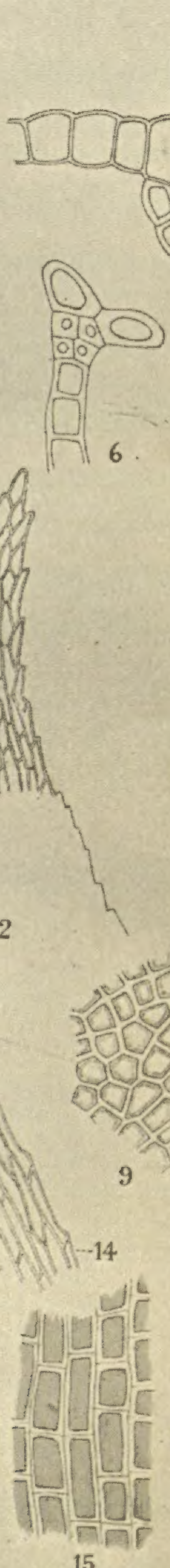
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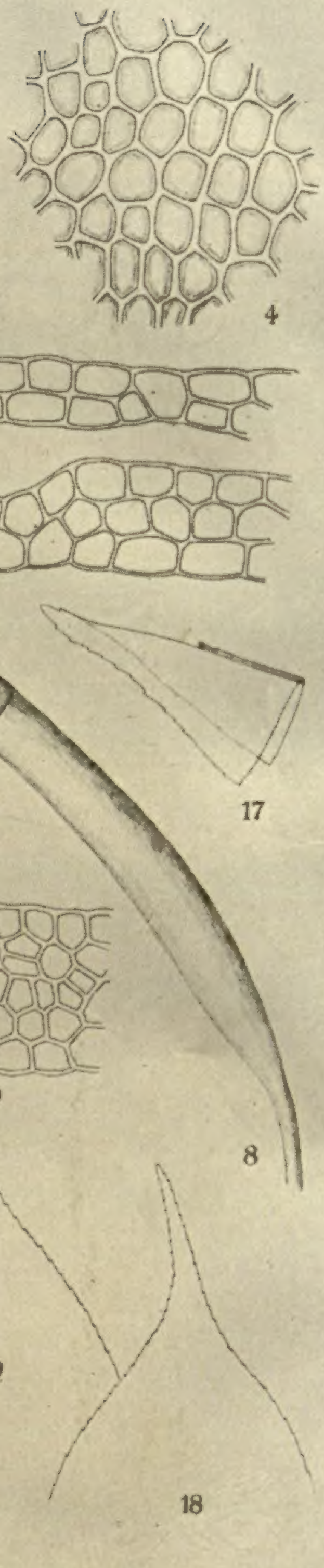
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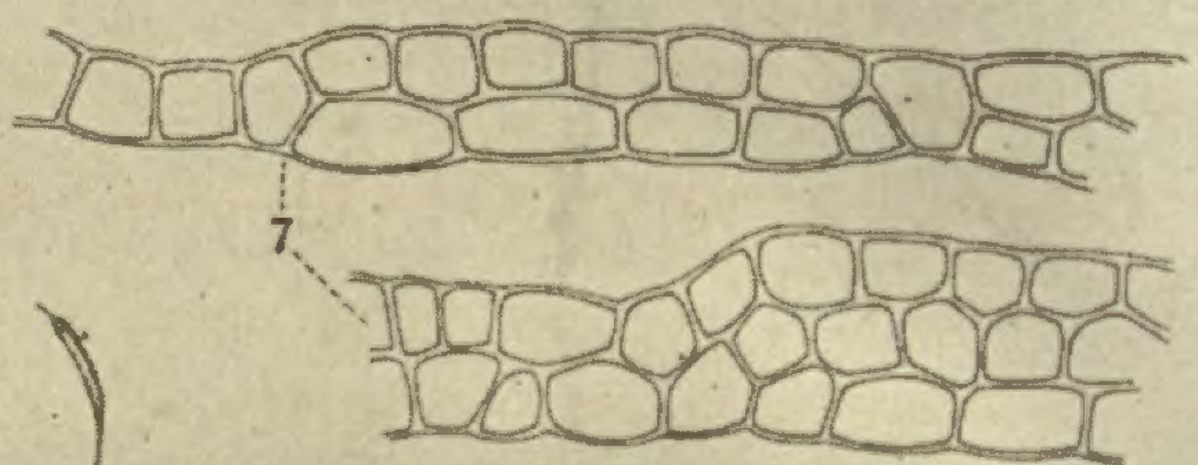
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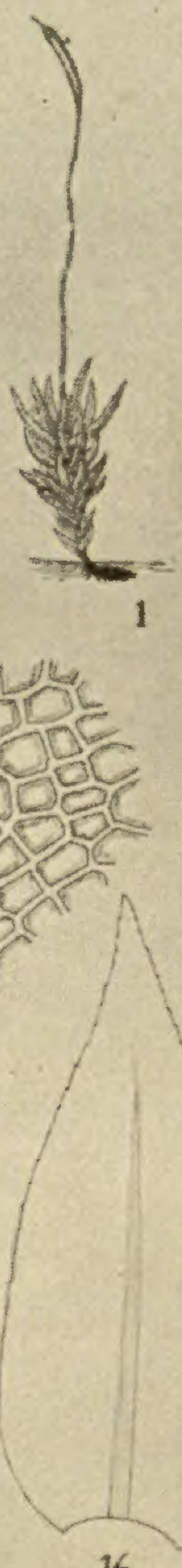
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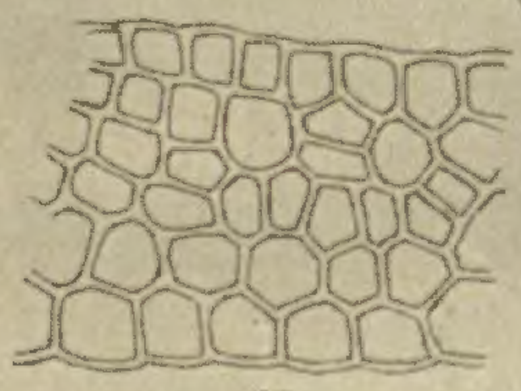
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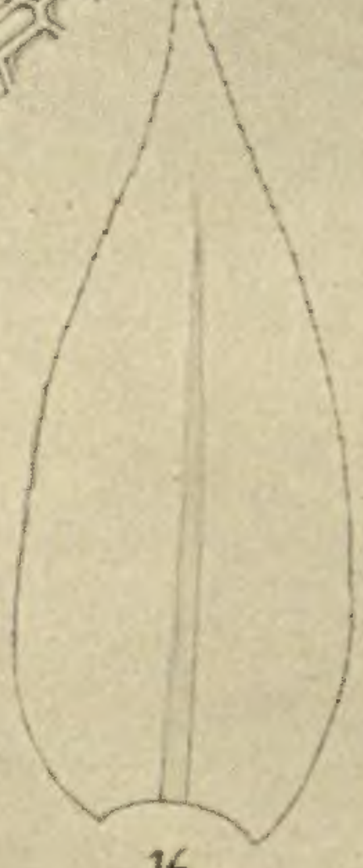
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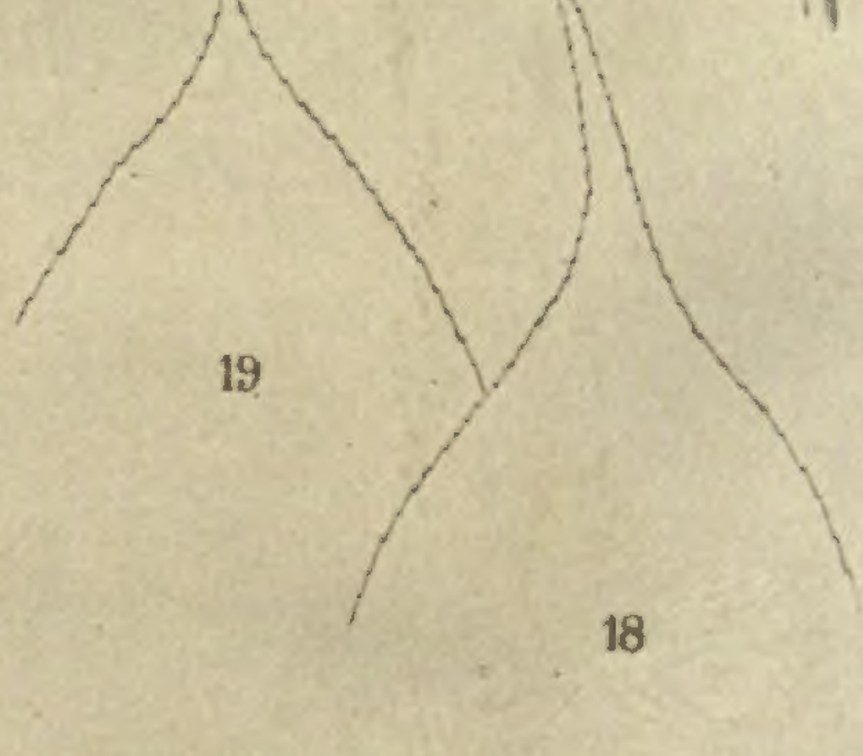
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E. S. Salmon del. West, Newman photo.

THE JOURNAL OF BOTANY

BRITISH AND FOREIGN.

BRYOLOGICAL NOTES.

By Ernest S. Salmon, F.L.S.

(Continued from Journ. Bot. 1901, p. 365.)

(Plate 429.)

In my previous note (Journ. Bot. 1901, p. 360) on *Anomodon Toccoæ* Sulliv. & Lesq., I mentioned that "Toccoa Falls, Northern Georgia"—the type locality for the species—was the only station known in North America. I have, however, just received, through the kindness of Mrs. Britton, a specimen (now in the Kew Herbarium) of *A. Toccoæ* from the "Falls of the Yadkin River, North Carolina," where it was collected by Dr. J. K. Small, in August, 1892. It is interesting to find that this example is distinctly flagelliferous.

(21). Chinese Mosses.

Amongst a few mosses lately brought back from China by Dr. A. Henry there occurs a new species of *Catharinea*. The following is the description of the plant:—

Catharinea Henryi, sp. n. (figs. 1–8). Dioica?, cæspitosa, humilis, gracilescens; caule erecto simplice vel dichotomo ad 1 cent. alto, foliis inferioribus minimis squamiformibus distantibus, superioribus et summis confertis patentibus et erecto-patentibus siccitate tortis et crispatis, superioribus obovatis vel oblongis, circ. 5 mill. longis, 1·5 mill. latis, summis longioribus, circ. 8 mill. longis, 1·3 mill. latis, anguste lingulatis, perichætialibus longissimis centimetrum et ultra longis, foliorum margine undulato anguste luteo-limbato ad medium et infra argute denticulato, dentibus folii apicem versus validis plerumque geminatis, nervo sat valido infra folii summum apicem evanido, apicem versus subtus spinoso-denticulato, lamellis paucis (2–4) humillimis ab uno strato (1–3) cellularum constructis, foliis superioribus et summis interdum leniter transversaliter undulatis subtus apicem versus denticulis sparsis hispidis, cellulis foliorum superioribus rotundato-quadrato-hexagonis chlorophyllosis, 15–20 μ latis, basilaribus rectangulis, fructu ex eodem perichætio solitario vel binato, capsula in pedunculo

gracili erecto plus minus flexuoso primum stramineo deinde purpureo, 2–2·5 cent. alto, elongato-cylindracea, 5–6 mill. longa in collum defluente lævi arcuato-subcernua pachyderma brunnea, operculo e basi hemisphærica inflata purpurea longe rostellato capsulæ tertiam partem æquante, rostello tenui subrecto vel curvato, peristomii dentibus 32, normalibus.

Hab. China; Yunnan, Szemao forest, 5000 ft. (*Dr. A. Henry*, no. 13,608).

C. rhystophyllæ C. Müll. (in Nuov. Giorn. Bot. Ital. n. ser. iii. 93 (1896)) habitu similis et affinis; foliis autem laxius areolatis, lamellis minus evolutis laxius areolatis nec non foliis haud vel vix transversaliter undulatis differt.

The present species closely resembles *C. rhystophylla* C. Müll. in general appearance. I am indebted to Dr. V. F. Brotherus for kindly sending me a specimen of Müller's species, from the type-locality Tue-lian-pin, Schen-si, China (*J. Giraldi*, April, 1895). On comparing this with the plant collected by Dr. Henry, it was found that the cells of the leaf and of the lamella were decidedly larger in the latter than in *C. rhystophylla*. In *C. Henryi* the leaf-cells measure 15–20 μ wide, whilst in *C. rhystophylla* they measure 10–14 μ wide (cfr. figs. 4 & 7 with figs. 9 & 10). The leaves of *C. rhystophylla* also differ in being regularly and strongly transversely undulate, with transverse rows of spines at the back of the leaf along the crests of the undulations; whilst in *C. Henryi* the leaves are not or only very slightly transversely undulate, and have only a few scattered spines at the back. The lamellæ also of *C. rhystophylla* are more developed (cfr. fig. 10 with fig. 7).

C. angustata Brid. differs from the present species in its smaller areolation (cells 10–14 μ wide), in the more numerous, more highly developed lamellæ, &c. It may be noted here that it seems doubtful if the true *C. angustata* really occurs in Japan. Mitten, in his "Enumeration of all the Species of Musci and Hepaticæ recorded from Japan" (Trans. Linn. Soc. London, 2nd ser. iii. (Bot.) 191 (1891)), includes this species on the strength of its being mentioned by Sande Lacoste in Miq. Ann. Mus. Bot. Lugd.-Bat. ii. 295, where the record runs, "copiosum legit Textor." Mitten, however, remarks that the plant intended "may be the narrow-leaved state of *A. undulatum*." There is a specimen in the Kew Herbarium, labelled "*Atrichum angustatum* Br. & Schpr. Japonia. Textor. Siebold." This proves on examination to be certainly not *C. angustata* (which has a dioicous inflorescence), as Textor's plant has an autoicous inflorescence, the male flower being situated close to the female.

The remaining mosses collected by Dr. Henry belong to the following species:—

Funaria hygrometrica Hedw., c. fr. Yunnan; mts. to south-west of Mengtse, on rocks, 7000 ft. alt. (no. 13,716).

Rhodobryum giganteum Hook., c. fr. Yunnan; Szemao, ravines, 3–5000 ft. (nos. 13,711, 13,711 A). — Fine fruiting examples of the species.

Polytrichum convolutum L. var. *cirratum* C. Müll., c. fr. Yun-

nan; mts. south of Red River from Mengtse, at 7000 ft. alt. (no. 13,715).

P. (*Pogonatum*) *microcarpum* R. Br., c. fr. Yunnan; Mts. to north of Mengtse, at 6000 ft. (no. 13,714); mts. to south-west of Mengtse, at 6000 ft. (no. 13,714 A)).

Lyellia crispa R. Br., c. fr. Yunnan; south of Red River from Mengtse, 3800 ft. alt. (no. 13,712).

Trachypus bicolor Reinw. & Hornsch., c. fr. Yunnan; mts. to north of Mengtse, 8000 ft. (no. 13,713).—New to the Chinese flora; hitherto known only from Sikkim, Neilgheries, Ceylon, Sumatra, Java, and Ceram (Moluccas). In the Chinese example the seta measures up to 3 cent. long.

Thuidium cymbifolium Bry. jav., c. fr. Szemao forest, ravine, on rock, 5000 ft. (no. 13,553).

Rhacopilum aristatum Mitt. Ape's Hill, Formosa, carpeting rock, at 1000 ft. (no. 2090).—An interesting discovery, the species being hitherto known only from a single locality (Yokohama).

Myuroclada concinna (Wils.) Besch. Manchuria; Tsien Mts., (*Dr. E. Faber*, no. 1510). The species was originally discovered by Alexander, "on an old wall, Chusan," China, Dec. 1845, and described by Wilson as *Hypnum concinnum*.

All the specimens are in the Kew Herbarium.

(22). Eucamptodon piliferus Mitt.

In Schimper's herbarium there is a moss labelled "*Dicranum inflatum* Sch. Samoa Fijee (Gräffe)." We find the same plant in Hampe's herbarium, labelled "Fiji Gräffe leg^{t}." in Schimper's handwriting. On this specimen Hampe has written "*Dicranum inflatum* n. sp.," and also, probably at a later date, "*Solmsia inflata*, theca junior sub lente gymnostoma. Fidji Ins. leg. Graeffe."

Müller, in his *Genera Muscorum Frondosorum*, p. 251 (1901), has referred to this Fiji moss as follows:—"Die angeführten neuseeländischen Arten [*Dicnemon Knightii* Hpe Herb. and *D. semicryptum* C. M.] dürften dreist zu den eigenthümlichsten Typen der Mooswelt gezählt werden. Diese Eigenthümlichkeit steigert sich bei einem Moose, welches Dr. E. Graeffe auf den Fidschi-Inseln fand, und welches von Hampe *Solmsia inflata* genannt wurde, beträchtlich. Dem ganzen Typus nach neigt es zu *Leucodontella* mit einer fast obsoleten dünnen Rippe; ebenso besitzt es den langen Hüllkelch; ob es aber ganz hierher gehöre, muss zweifelhaft bleiben, da ich keine Frucht zu vergleichen habe. Nach Hampe würde selbige nacktmündig sein müssen. Die Blätter, schuppig, wie sie aufquellend übereinander liegen, sind in eine längere wellige Spitze ausgezogen, wodurch das Moos einzig dasteht."

The example of "*D. inflatum*" in Schimper's herbarium is in excellent condition, and belongs without doubt to *Eucamptodon piliferus* Mitt. Musc. Austr. Amer. p. 69 (1869). Some of the plants are in fruit, and the peristome of a ripe capsule that was examined was found to be formed as in *E. piliferus*.

The occurrence of *E. piliferus* in Fiji is a fact of very great

interest from the geographical point of view. The species was found originally in the West Indies. Mitten (*l. c.*) gives the locality as "Ins. Trinidad, Margarita, Palma Real, Crüger." With regard to this locality a curious mistake has been made by Paris in his *Index Bryologicus* (Actes Soc. Linn. Bordeaux, xlix. p. 238). Here the distribution of the species is given as "*Am. Sept.* Ins. S. Margarit. *Am. Merid.* Ins. Trinitat." The locality given by Mitten, however, certainly does not refer to the island of Santa Margarita off Lower California, but either to the island of Margarita off Venezuela, or, what is perhaps more probable, the words "Margarita, Palma Real" refer to a single locality in Trinidad. "Palma Real" is the Spanish name for the common Royal Palm (*Oreodoxa*) of the West Indies, and as the habitat of *E. piliferus* is, according to Mitten, "*in arborum cortice*," it may well be that by "Palma Real" was intended, not a locality, but the name of the tree on which the moss was found. The only other station hitherto known for the plant is Guadeloupe, whence specimens were distributed in Husnot's Pl. des Antilles, no. 192, under the manuscript name of "*Holomitrium cavifolium* Schpr." (Paris (*l. c.*) has wrongly identified this station with the island of Guadalupe off Lower California, whereas the island of Guadeloupe in the French Antilles is intended).

It is strange that so conspicuous a species as *E. piliferus* should have remained so long unrecorded from Fiji. Graeffe, apparently, can only have collected a few specimens of the moss, as no mention of the species is found in the papers by Müller in which Graeffe's collection was worked out—"Musci polynesiaci præsertim Vitiani et Samoani Graeffeani" (Journ. des Museum Godeffroy, vi. 51–90 (1873–74)) and "Die Flora der Samoa-Inseln; Musci" (Engler's Bot. Jahrb. xxiii. 317–332 (1897)).

The identity of a Fiji moss with a West Indian one is certainly a remarkable fact, but it is to be noted that the present case does not stand alone. Müller, in concluding some extremely interesting remarks on the affinities of the moss-flora of Polynesia, has written (in the first paper of his quoted above (p. 55)):—"Hiernach ist die Zusammensetzung der melanesisch-polynesischen Inseln eine *sundaisch-australisch-westindische* mit einem kleinen Zusatze eigenthümlicher Arten. Dehnt man sich im Geiste unsere fragliche Moosflor bis zu den Sandwichinseln, der Galapagosinseln gar nicht zu gedenken, aus, so gewinnt der westindische oder tropisch-amerikanische Charakter eine viel grössere Intensität."

The synonymy and distribution of the present species are as follows:—

Eucamptodon piliferus Mitt. Musc. Austr. Amer. 69 (1869).
Holomitrium cavifolium Schimp. in Husnot, Pl. des Antilles, no 192 (1868).
H. piliferum Besch. Florule Bryolog. des Antilles Françaises (Ann. Sci. Nat. vi. sér. iii, 189 (1876)); Paris, Index Bryolog. (Actes Soc. Linn. Bord. xlix. 238 (1895)).
Solmsia inflata Hpe. MSS.; C. Müll. Gen. Musc. Frond. 251 (1901).
Dicranum inflatum Schimp. MSS. in herb.

DISTRIBUTION.—*West Indies:* Margarita, Palma Real, Trinidad (Crüger), c. fr.! Guadeloupe, "vieilles souches, morne de la Découverte" (Husnot, Pl. des Antilles, 1868, no. 192, alt. 1150 m.), c. fr.!

Polynesia: Fiji (Graeffe), c. fr.!

(23). DICNEMON RUGOSUS (Hook.) Schwaegr.; D. BANKSII C. Müll.; D. GIGANTEUS Schimp. MSS.; and HOLOMITRIUM PROCERRIMUM Schimp. MSS.

In Schimper's herbarium there are two specimens of a moss, one labelled "*Holomitrium procerrimum* Sch. Taiti"; the other "*Dicnemon giganteus* Sch. Taiti. Sir Wm. Hooker dedit June, 1865." These specimens belong to *Dicnemon rugosus* (Hook.) Schwaegr. Both specimens bear fruit, and represent a robust form of the species, the stems in the latter example measuring 10 cm. in height. *D. rugosus* was originally described and figured as *Leucodon rugosus* by Hooker in Musc. Exot. 1, tab. xx. (1818), and the habitat given as "In Nova Hollandia. Turn. Herb. a Dicksonio missus." No definite information as to the exact locality or the name of the collector seems ever to have been published.

In 1858, Müller, in Bot. Zeit. xvi. 161, described a species of *Dicnemon* collected by Banks in Tahiti as *D. Banksii*, considered by the author to differ from *D. rugosus* in certain vegetative characters. The description runs as follows:—"Folia caulina æqualia (haud rugosa) dense imbricata robustissima, late ovato-lanceolata, basi constricta, superne plus minus involuta, *inferne margine albida*, nervo tenui complanato in mucronulum exeunte percursa, *infra nervum denticulata*, e cellulis lineari-ellipticis conflatis lutescentibus, alaribus parenchymaticis laxis fuscescentibus planis areolata, . . . A *D. rugoso* foliis denticulatis jam refugit. . . . . Margine folii albido ad *Leucoloma* accedit." Subsequent authors have followed Müller in referring the Tahiti plant to a species (*D. Banksii*) distinct from *D. rugosus*, with the exception, it may be noted, of Sullivant, who in 1859 (in U.S. Expl. Expedit. 1838–42, Botany (*Musci*), p. 5), records *D. rugosus* from "Tahiti, Society Islands." There are examples so named of this plant in the Kew Herbarium, labelled "U. S. Ex. Ex. Wilkes, 1838–1842, no. 217."

The question of the distinctness of *D. Banksii* from *D. rugosus* is referred to by Bescherelle in his "Florule de Tahiti" (Ann. Sci. Nat. vii. sér. xx. 18 (1895)) in the following words: "Dans la diagnose qui précède (Müller's diagnosis of *D. Banksii* in Bot. Zeit. (*l. c.*)) M. Ch. Mueller dit que les feuilles caulinaires sont *haud rugosa*, ce qui distingue au premier abord le *D. Banksii* du *D. rugosus*. Dans tous les échantillons de Tahiti que nous avons examinés, les feuilles sont, étant sèches, plus ou moins rugueuses transversalement, mais comme elles sont dentées au sommet et bordées d'une marge qui rappelle celle des *Leucoloma*, on ne saurait rattacher ces échantillons qu'au *D. Banksii*. Du reste le *D. rugosus* n'a encore été trouvé qu'à la Nouvelle Hollande; le seul échantillon connu aurait été donné par Dickson à Turner et par celui-ci à

Hooker qui l'a décrit et dessiné dans ses *Musci Exotici*, tab. 20 (1818). Schwaegrichen l'aurait reçu de Turner (Supplément, 1824) ou de Taylor (Supplément, 1828), mais quel que soit l'intermédiaire on ne connaît pas le nom du collecteur, ni celui de la localité spéciale où la plante a été récoltée. Bridel ne l'a pas vue, M. Ch. Mueller non plus, et je n'ai pu moi-même m'en procurer un exemplaire. Il pourrait donc se faire qu'en étudiant plus attentivement le *D. rugosus* on arrivât à l'identifier avec le *D. Banksii*, à moins qu'on n'établisse pour les échantillons de Tahiti, autres que ceux de Banks, une espèce nouvelle intermédiaire qui tiendrait du *D. rugosus* par la rugosité des feuilles et du *D. Banksii* par la dentelure et la marge de ces mêmes organes."

Through the kindness of Dr. P. Hennings I have been able to see a piece of the type-specimen (leg. Banks) of *D. Banksii* from Müller's herbarium at Berlin, as well as specimens labelled "*Eucamptodon Banksii* C. Müll. (*Dicnemon Banksii*) Tahiti, Ribourt, no. 161." I have compared these specimens with Hooker's type of "*Leucodon rugosus*" at Kew, and found them to be identical. In the first place, the leaves of Müller's plant, both in the type-specimen and in the specimens collected by Ribourt, are decidedly rugose (if first moistened and then allowed to dry naturally without being subjected to pressure), and agree perfectly in this respect with the leaves of Hooker's type. Further, although both Hooker and Schwaegrichen describe the margin of the leaf in *D. rugosus* as "quite entire," examination of the type-specimen shows that the margin towards the apex of the leaf is irregularly and usually bluntly—but sometimes acutely—denticulate, in exactly the same manner as in Müller's "*D. Banksii*." The whitish margin of the leaf occurs in both plants.

With regard to the original record of *D. rugosus* from "New Holland," it may be pointed out here that, owing to the manner in which Dickson obtained his mosses, considerable doubt exists in many instances as to the accuracy of the localities given by him. The following remarks by Mitten (in Melliss's *St. Helena*, p. 360 (1875)) on the subject are instructive: "It is most probable that the specimen of this species (*Macromitrium Seemanni* Mitt.) from Dickson, marked as from the East Indies and now preserved in the Kew Herbarium, was really gathered in St. Helena. Dickson obtained specimens of mosses from the voyages of trading vessels, and localities were then not so precisely mentioned, so that any gathered during the voyage were liable to be reported as if gathered in the country the vessel had returned from; and there are some of the species which Dickson in this manner procured, of which the native country has yet to be discovered." We have reason, therefore, to regard with suspicion the Australian record of Dickson's for *D. rugosus* when we find, as I believe is the case, that no botanist has since collected this conspicuous plant in that country. It is even possible that the original specimen of "*Leucodon rugosus*" may have come, like Müller's plant, from Tahiti.

In the specimen of "*D. giganteum* Sch." there is a mature calyptra on one of the capsules. The calyptra, which has not

previously been seen in the present species, is cucullate in shape, and slightly scabrous towards the apex; it measures 4 mill. long.

The synonymy and distribution of *D. rugosus* are as follows:—

Leucodon rugosus Hook. Musc. Exot. i. tab. xx. (1818).
Dicnemon rugosum Schwaegr. Sp. Musc. Suppl. II. i. 127 (1823); *l. c.* II. ii. 72, tab. clxxiv (1827); Brid. Bry. Univ. ii. 216 (1827); C. Müll. Syn. Musc. Frond. i. 347 (1849).
D. Banksii C. Müll. in Bot. Zeit. xvi. 161 (1858); Besch. in Ann. Sci. Nat. vii. sér. xx. 18 (1895).
Eucamptodon Banksii C. Müll. Gen. Musc. Frond. 248 (1901).
Dicranum densifolium Web. & Mohr MSS. (*fide* C. Müll.).
Dicnemon giganteum Schimp. MSS. in herb.
Holomitrium procerrimum Schimp. MSS. in herb.

DISTRIBUTION:—? Australia, c. fr.! Polynesia; Tahiti (Wilkes, U.S. Explor. Exped. 1838-42), c. fr.!; (Banks)!; (Moseley, "Challenger" Exped.), c. fr.!; (Ribourt, 1850, no. 161)!; "Vallées sèches de la région N. O. de l'île, vers 800 mètres, au Pinaï, sur les troncs du *Meryta lanceolata* (Nadeaud, no. 55).

(24). HYPNUM LENTUM Mitt.

In Journ. Linn. Soc. viii. 36 (1865) Mitten published a species under the name of *Hypnum* (*Isothecium*) *lentum*, with the following description:—"Dioicum, foliis patentibus laxe imbricatis, in apicibus ramorum cuspidato-imbricatis, inferioribus latioribus brevioribus in ramorum medio ubi fructus proferunt late ovatis acumine brevi, in ramulis attenuatis ovato-lanceolatis apicibus latioribus obtusioribus, marginibus tenuiter in ramulinis argutius serrulatis nervo ultra medium evanido, cellulis basi ad angulos pluribus latioribus angustioribus immixtis parietibus crassiusculis, superioribus angustis, quasi apicibus dorso prominulis, in apice oblongis, perichætialibus enerviis e basi ovali amplexante subulatis recurvis subintegerrimis, theca in pedunculo unciali scabro ovali cylindracea suberecta inæquali, peristomio interno processibus solidis ciliis singulis subæquilongis in membrana ad dentium tertiam longitudinis exserta. Hab. N.W. coast of America (Douglas). Of this moss only a few fragments have been seen. It appears to be about the size of the common forms of *H. myurum*, but of a loose spreading habit. At first it was supposed that this was only a state of *H. aplocladum*; but the decidedly rough seta and wider leaves, those of the perichætium spreading, render it distinct."

Jaeger (Adumbr. ii. 376 (1878)) transferred the species to the genus *Homalothecium* (not to *Eurhynchium*, as Paris (Index Bryolog., Actes Soc. Linn. Bord. l. 5 (1896)) states).

Kindberg, in Macoun's Cat. Canad. Plants (Musci), pt. vi. p. 203 (1892), referred the plant sent out as "*Isothecium stoloniferum* Hook.; on trees in the vicinity of Victoria, Vancouver Island (Macoun) in Macoun, *Canadian Musci*, no. 292, *in part*" to *Isothecium lentum* Mitt.

Grout, in his Revision of the North American *Eurhynchia* (Bull. Torr. Bot. Club, xxv. 256 (1898)), remarked, "*Hypnum lentum* Mitt. appears to be a *Scleropodium*, *S. lentum* (Mitt.)?" Subse-

quently the same author, in his Revision of the North American species of *Scleropodium* (*l. c.* xxvi. 537 (1899)), wrote:—"I feel quite sure that *Hypnum lentum* Mitt. is at least nothing more than a variety of *S. cæspitosum*, and probably is identical with it. *S. cæspitosum* was very little known at the time *Hypnum lentum* was published, and a careful reading of the original description will fail to show any distinction of importance between the two. The matter cannot be definitely settled until Mitten's type is accessible."

Mr. Mitten has kindly allowed me to examine all the material accessible of "*Hypnum lentum*" in his herbarium. The type itself was sent many years ago to Sullivant, and on the death of this botanist either became lost, or was returned to Mr. Mitten and mislaid by him, so that it is not now to be found in its place in his herbarium. The only example now remaining in Mr. Mitten's herbarium on the sheet marked "*H. lentum*" is a fragmentary specimen, under which is written, "N.W. coast of America, Douglas." With this specimen Mr. Mitten also sent the example in Mac. Canad. Musci, no. 292, of "*Isothecium stoloniferum*, from old logs, Vancouver Island, 1887 (Macoun)," which, as noted above, Kindberg has referred to *H. lentum*. Now, the specimen left on the sheet marked "N.W. Coast of America, Douglas," exactly matches the plant in Macoun, Canad. Musci, no. 292. On plate 429, I have given figures of the stem- and branch-leaves, areolation, nerve, &c., from Mitten's plant. Further, identically the same plant appears in Sulliv. & Lesquer. Musc. Bor. Amer. ed. ii. no. 510, as *Hypnum cæspitosum*, "ad terram umbrosam et rupes humidas Californiæ inferioris, vulgare (Bolander legit)." It appears to me to be quite safe from Mitten's original description, and from the evidence afforded by the fragment in his herbarium, to consider "*H. lentum*" as identical with the form of *Scleropodium cæspitosum* which is found, *e. g.* in Sulliv. & Lesq. Musc. Bor. Amer. no. 510. This form differs from the usual European examples of *S. cæspitosum* in its looser and more straggling habit, and in the longer acumination of the leaf-apex. Mr. H. N. Dixon has kindly given me his opinion on the question whether this form is able to be separated varietally from *S. cæspitosum*. Mr. Dixon writes:—"I think there is no doubt that the *S. cæspitosum* in Sulliv. & Lesq. Exsicc. is correctly named. It agrees very closely with no. 386 of Husnot's Musci Gall.—the fruiting specimen; I cannot, indeed, detect any difference. Further, a specimen I have of '*Isothecium lentum*' Mitt. leg. C. V. Piper, comm. Dr. Best, from Seattle, Wash., while having the comparatively long acumen to the leaves, has much more the habit of our ordinary *S. cæspitosum;* it agrees in fruit and leaf-structure. So that whether it is correctly named *lentum* or not, it helps to bridge over the very slight difference in characters between the *I. lentum* and our *typical S. cæspitosum*. As regards habit, the plant (c. fr.) in Husnot, Musc. Gall. no. 386, is a very fair parallel, I think. The fruiting characters seem identical. I certainly should not be inclined to make even a variety out of '*H. lentum*.'"

A comparison of the material of *S. cæspitosum* in the Kew and S. Kensington herbaria has convinced me that Mr. Dixon's view is

correct. There is a specimen at Kew of *S. cæspitosum* with a habit very similar to that of "*H. lentum*" from Hurstpierpoint, Sussex, "ad truncos arborum prope rivulos, Mitten leg. Nov. 1846." Also, in Hampe's herbarium at South Kensington there is a specimen collected by Wilson from "near Warrington," England, in which we find the loose straggling habit and the long branches of the American form. It is clear, too, that the degree of acumination of the leaf-apex in *S. cæspitosum* is very variable. In the example in Sulliv. & Lesquer. Musc. Bor. Amer. no. 510, some stems bear leaves of which the apex is finely acuminate, as shown at fig. 18, whilst the leaves of other stems are merely acute, as shown at fig. 19.

Explanation of Plate 429.

Figs. 1–8.—*Catharinea Henryi* sp. nov. 1. Plant, natural size. 2. Leaf, from about half-way up the stem × 8. 3. Two leaves towards the apex of the stem × 6. 4. Areolation of leaf, at one-third from the apex × 270. 5. Transverse section of a leaf at about one-third from the apex × 270. 6. Transverse section of margin of leaf at about one-third from the apex × 270. 7. Portions of two lamellæ, seen from the side,—one to three cells high × 270. 8. Capsule and operculum × 8.

Figs. 9, 10.—*Catharinea rhystophylla* C. Müll. 9. Areolation of leaf at one-third from the apex × 270. 10. Portion of a lamella seen from the side × 270.

Figs. 11–19.—*Scleropodium cæspitosum* (Wils.). 11. Stem-leaf × 28. 12. Apex of same × 150. 13. Areolation of same at one-third from the apex × 270. 14. Margin of same at one-third from the apex × 270. 15. Areolation at basal angles × 270. 16. Branch-leaf × 35. 17. Upper part of branch-leaf, showing the nerve projecting at tip from the back of the leaf × 60—all from the specimen labelled "N.W. Coast of America (Douglas)" in Mitten's herbarium (see p. 8). 18, 19. Apex of two leaves, from the example in Sulliv. & Lesquer. Musc. Bor. Amer. no. 510 × 60.

SOME SOUTH AFRICAN SPECIES OF COTYLEDON.

By S. Schönland, M.A., Ph.D., F.L.S., & Edmund G. Baker, F.L.S.

Introductory.

The genus *Cotyledon* is divisible into four sections—I. *Eucotyledon*; II. *Umbilicus*; III. *Pistorinia*; and IV. *Echeveria*—easily recognizable by considerable difference in habit, shape of corolla, &c. The following notes are confined to certain of the members of the section *Eucotyledon*, which is, with trifling exception, limited in its geographical distribution to South Africa. The material on which the notes have been made is derived from various sources, which it may be well to specify:—A series of live specimens grown at Grahamstown; the Herbarium of Albany Museum, Grahamstown; the Sherardian Herbarium, Oxford, especially valuable, as it contains a number of types of Haworth's and Salm Dyck's species; Herbarium of Trinity College, Dublin, containing Harvey's *Crassulaceæ*; the National and Kew Herbaria. The Cape Government Herbarium has also been consulted. For the loan of plants

from Oxford, Dublin, and Capetown we have to thank Prof. Vines, Prof. Perceval Wright, and Prof. MacOwan.

In the works of some of the botanical writers of the end of the seventeenth and beginning of the eighteenth centuries we find figures of plants of this genus, the correct interpretation of which is a matter of primary importance. Very frequently these figures will be found quoted by subsequent writers under more than one species, leading to considerable confusion.

R. Morison, in his *Plantarum Historia*, vol. iii. (1699), figures two Cotyledons—*Sedum Africanum frutescens*, &c., Sect. 12, tab. 7, fig. 39; and *Sedum africanum teretifolium*, Sect. 12, tab. 7, fig. 40. The first of these is quoted by Haworth (*Suppl. Pl. Succ.* p. 24) as a synonym of *C. ramosa*; the second (p. 23) under the somewhat heterogeneous species *C. spuria*.

In Caspar Commelin's *Hort. Med. Amstelaedamensis* (1706) one is figured—*Cotyledon Africana frutescens folio longo et angusto, flore flavescente* (p. 23). This figure has been quoted for various plants. It is the first of the figures quoted for *Cotyledon spuria* by Linnæus (Sp. Pl. ed. 2, 614). Haworth (Suppl. Pl. Succ. p. 23) excludes it from *C. spuria* and places it under his *C. purpurea*; it does not, however, at all agree with his specimen of *C. purpurea* which is in the Oxford Herbarium, but seems rather to be the plant figured by De Candolle (Pl. Grasses, t. 168) as *C. ungulata* Lam.

The most important of the older figures of *Cotyledon* are those of J. Burman in his Decades, 1738. To many of these he subsequently in his Prodr. Fl. Cap. (1768) assigned trivial names; and their correct interpretation is therefore important. They have been very variously cited: for instance, tab. 22, fig. 1, *Cotyledon foliis angustis*, &c., is quoted by Linnæus (Sp. Pl. ed. 2, p. 614) for his *C. spuria*; Lamarck (1786) quotes it for his *C. ungulata*; Haworth (Suppl. 21) for his *C. papillaris*; and Sims (Bot. Mag. t. 2518 (1824)) for his *C. decussata*.

The plant figured by Burman (tab. 19, fig. 2) as *Cotyledon foliis latis sinuosis*, &c., is for us of especial interest. Lamarck quotes it for his *C. mucronata*, placiug it as one of his "espèces imparfaitement connues"; it was only known to him from Burman's figure. De Candolle (Prodr. iii, p. 398 (1828)) gives a brief diagnosis, and quotes *C. undulata* Haworth* as a synonym; and Harvey (Fl. Cap. iii. p. 378) places it among the "imperfectly known and doubtful species." We think that a plant gathered by Mr. G. Rattray at Graaff Reinet, No. 18, is identical with Burman's figure: our notes on the subject will be found later.

A plant gathered by Mr. Bolus near Graaff Reinet has been identified with Burman's tab. 17, and constitutes another interesting rediscovery of a plant known to the older writers. There can be little doubt that this is *C. jasminiflora* Salm Dyck, which has long ranked among the imperfectly known species.

We interpret Burman's figures as follows:—

* We have seen Haworth's type of this, and do not consider it agrees with Burman's figure.

Tab. 17. = *C. caryophyllacea* Burm. (= *C. jasminiflora* Salm Dyck).
Tab. 18. = *C. fascicularis* Ait. (= *C. paniculata* L. *fide* Thunberg).
Tab. 19 (1). *C. spuria* L. (?).
Tab. 19 (2). *C. mucronata* Lam. (see note on this species).
Tab. 20 (1). *C. grandiflora* Burm. (= *C. tuberculosa* Lam.).
Tab. 20 (2). This, according to Thunberg, is *C. cacalioides* L.
Tab. 21 (1). *C. ventricosa* Burm.
[Tab. 21 (2). *Aitonia capensis* Thunb.]
Tab. 22 (1). A bad figure of *C. decussata* Sims.

Sect. I. Paniculatæ.

C. orbiculata L. Sp. Pl. 429 (1753). There seem to be more than one species under this name as treated by Harvey in the *Flora Capensis*, ii. p. 371; we have separated from it Zeyher 2566, a plant to which we have given the name *C. Beckeri*.

De Candolle (Prodr. iii. 396) gives the following varieties of this species:—

α rotundifolia. This is *C. orbiculata* Haworth, Revis. p. 105 (*C. orbiculata* γ *rotunda* DC. Pl. Grasses, t. 76). There is a specimen of Haworth's *C. orbiculata* in the Oxford Herbarium, from which the following notes have been made. Leaves orbicular, spathulate, ± 6·5 cm. long, ± 5 cm. broad, obtuse, with a mucro. Peduncle ± 23 cm. long before branching—6-flowered in Haworth's specimen. Calyx-tube ± 3 mm. long, lobes triangular, acute, ± 3 mm. or sometimes deltoid. Corolla-tube 1·6–1·8 cm., lobes ± 12 mm. long, lanceolate. Salisbury (Prodr. 307, 1796) changed the name *orbiculata* to *ambigua*.

β obovata. *C. orata* Haworth, *l. c.* *C. orbiculata* var. α, DC. Pl. Grasses, t. 76; Bot. Mag. tab. 321; Morison, Oxon. vol. iii. 12, t. 7, f. 39; Herm. Lugd. Bat. 551 ic.

γ oblonga. *C. oblonga* Haworth, *l. c.* p. 106. *C. orbiculata* β Aiton, Hort. Kew. ed. 2, iii. p. 108. The following is Haworth's description of this plant—there is no specimen in the Oxford Herbarium:—"Foliis oblongo-spathulatis obtusis (farinoso-albis?) cum acumine lævibus; floribus paniculatis, caudice erecto ramoso."

We doubtfully refer here a plant gathered by Mr. E. Galpin in June, 1900, on "rocky krauses on Nahoon river, East London." No. 5670.

δ elata. *C. elata* Haworth, Suppl. p. 20. Haworth's diagnosis of this is as follows:—"C. foliis orbiculato obovato ovalive-cuneatis, cum acumine obtuso brevi farinoso-albis; caule firmo elato ramoso." There is no specimen at Oxford. He doubtfully refers to this, *Cotyledon triflora, foliis obovato-carnosis integris, floribus spicatis ternis sessilibus* of Thunberg (Prod. p. 83), and *Cotyledon triflora foliis obovatis*, &c. (L. Suppl. Pl. p. 242).

Salm Dyck considers this doubtfully synonymous with *C. triflora* Thunb., but Haworth in a note contrasts it with *C. orbiculata* L.

ε ramosa. *C. ramosa* Haworth, Suppl. p. 24. *C. ramosissima* Mill. Dict. ed. 8, No. 6 (1768). *C. orbiculata* γ Aiton, *l. c.* Under this variety De Candolle says:—"An *C. crassifolia* et *C. viridis* nuperrime a cl. Haworthio (Phil. Mag, 1827, apr. p. 123) huc

etiam indicatæ ut varietates recensendæ." Haworth quotes as a synonym of his *ramosa*, *Sedum africanum frutescens incanum foliis orbiculatis* Morison, vol. iii. Sect. 12, t. 7, f. 39, which we have placed under var. *obovata*.

The flowers of Zeyher 672, one of the plants quoted by Harvey under *C. orbiculata*, differ (in the Oxford specimen—the only one we have seen) from the type in the following particulars: Calyx-lobes deltoid acuminate or subacuminate, more rarely triangular, with rather wide interspaces; lobes narrower than those of *C. orbiculata* L., 3–4 mm. long. Corolla over 2·5 cm. long; lobes lanceolate; corolla-tube 2 cm. long. Peduncle about 10-flowered. Leaves thick, fleshy, obovate, pointed.

The following notes are from a plant collected by R. Schlechter "in collibus aridis prope Brand Vley, Regionis Occidentalis, alt. 1200 ft.," No. 9932. It is probably identical with the preceding (Zeyher 672):—Leaves thick, coriaceous, oblong-lanceolate or ob-lanceolate, mucronate, margin irregularly undulate, much longer than broad, thus differing from the leaves of the type of *C. orbiculata* L., 10–13 cm. long, 3–4·5 cm. broad at broadest point, which is about one-fourth the length from the apex. Peduncle rather stout in specimen before us, 16–18-flowered. Flowers pendulous and erect. Calyx-lobes deltoid, acute or subacuminate, 3·5 mm. long. Corolla-tube ± 2 cm. long, lobes lanceolate, acute, ± 1·7 cm. long. Filaments shorter than the petals, not broadened below, as in *C. Beckeri* Schönld. & Bak. fil. Carpels tapering gradually above into long slender styles, ± 3·5 cm. long. Squamæ broadly ovate, broader than long, apex subtruncate or subemarginate, ± 1 mm. long, ± 2 mm. broad Allied to *C. crassifolia* Haw. and *C. undulata* Haw.

C. Beckeri, sp. nov. Frutex sæpissime cr. 1·5–2 m. altus. Folia ambitu ovata vel anguste obovata vel oblonga opposita glauca plana dorso carinata mucronata, 6–8 cm. longa, 1·8–2·8 cm. lata, cr. 2–2·5 mm. crassa, internodiis 1–1·5 cm. Pedunculus cr. 20 cm. Flores in paniculam corymbosim dispositi sub anthesi erecti vel suberecti patuli. Calyx 7 mm. longus, calycis lobi cr. 5 mm. lanceolati acuti vel subacuminati quam corollæ tubus breviores extus sparse glandulosi. Corollæ tubus bene evolutus, cr. 18 mm. longus, lobi cr. 22 mm. longi, ensiformes. Petala in æstivatione spiraliter torta. Stamina quam tubus longiora quam lobi paullo breviora, filamentis inferne dilatatis pilis ad basin filamentis nullis. Squamæ subquadratæ latiores quam longæ.

Hab. In scrub, Dassie Krantz, Grahamstown, alt. 2200 ft. Flowers dull reddish, *E. E. Galpin*, no. 2915. In flower Dec. 16th, 1898. Near Grahamstown, *F. W. Rogers*, Oct. 1899.

A straggling shrub; leaves somewhat variable in shape, slightly glaucous, dark red on margins, and slightly carinate on back. Corolla in transverse section pentagonal, with rounded edges, dark red outside, with blotches of pale yellow—pale yellow inside, lined with red. Petals spirally twisted in bud. Panicle spreading, the flowers (12–26) for the most part erect.

This species is allied to *C. velutina*; it is fairly common in the

bush in Albany and towards the sea-coast. It is the same as *Zeyher* 2566 in Cape Government Herbarium, which is placed by Harvey under *C. orbiculata*. Apart from other characters, the broadened filaments, which close the nectar cavity instead of the usual hairs, make it singular. We have named it in honour of Dr. H. Becker, F.L.S., F.S.A., of Grahamstown.

A strongly pubescent variety, which is not represented in the Albany Museum Herbarium, has been found by Mr. H. G. Flanagan, F.L.S., near Komgha (No. 1317).

C. UNDULATA Haworth, Suppl. p. 20 (1819). Haworth quotes as a synonym *Cotyledon foliis latis sinuosis*, &c., Burman, Dec. tab. 19, fig. 2, which plate was also quoted by Lamarck for his *C. mucronata*. A careful comparison of Burman's plate and Haworth's type of *undulata* shows points of difference between the two.

It may be well to give a rather more detailed description of *C. undulata* from Haworth's type.

Leaves subrhombeo-cuneate, older leaves rounded at the apex, 10 cm. long, 5 cm. broad at broadest point, smaller leaves at base of peduncle ovate-lanceolate, 5·5 cm. long. Peduncle ± 12·5 cm. before the branches commence. Flowers in a corymbose panicle, very similar to flowers of *C. orbiculata*. Calyx-tube 4 mm. long, lobes triangular acute, 4 mm. long. Corolla-tube ± 1·7 cm. long, lobes narrowing to a point, 12 mm. long. Stamens shorter than corolla-lobes.

We append a description of a plant common near Grahamstown, which is either *C. undulata* Haworth or a close ally.

Caulis fruticoso-carnosus, crassus, dependens, ramosus. Folia decussata, cuneato-oblonga, obtusa vel acuminata vel apice margine undulata, crassa, subplana, intus concava, pallide viridia, apicem versus rubro-marginata, epidermide minimis punctulis notato, glabro, lævi. Inflorescentia pseudo-paniculata, multiflora, pedunculo longo, depauperato, floribus ad anthesin pendulis. Calyx monophyllus, laciniis ovato-lanceolatis, c. 8 mm. longis. Corolla monophylla, tubo c. 2·7 cm. longo, laciniis oblongis acuminatis, extrorsum revolutis, c. 1·7 cm. longis. Filamenta flava, ciliis albidis fauce minutis, antheris ovatis, subapiculatis. Carpella gracilia, stigmatis capitatis; squamis subquadratis, apice et lateraliter emarginatis, subliberis.

The plant from which the above description is taken is very common near Grahamstown, and there is very little doubt that it is the plant figured in Bot. Mag. t. 2601, which, if true, should not be included in *C. orbiculata*. Zeyher 2567 seems to be the same plant. There is a specimen in the Cape Government Herbarium.

We look upon the following as distinguishing characters:—The plant has a procumbent growth; the corolla is nearly cylindrical; the flowers are very decidedly pendulous; the calyx-lobes are ovate-lanceolate; the squamæ are nearly all quadrate, though a little narrower towards the apex, and emarginate above and on the sides; they are laterally almost unconnected with the carpels. The corolla is bright red, finely pencilled with yellow, becoming more yellow towards the pedicel; the calyx is green, more or less

tinged with deep red; the squamæ are pale yellow, greenish towards the base. The leaves are about 10–14 cm. long and 4·5–7 cm. broad at the broadest point; the thickness in the middle is about 5 mm. Flowers through the greater part of the summer.

C. CRASSIFOLIA Haworth in Phil. Mag. 1827, p. 273 (not Salisb. Prodr. 307, which = *C. hemisphærica* L.). The following notes are taken from the type of this plant in the Oxford Herbarium:—It is closely related to *C. undulata* Haw. Leaves subrhombeo-cuneate, when dried somewhat leathery in consistence, ± 5 cm. long, ± 3 cm. broad at broadest point, which is about one-third of length from apex, uppermost leaves ± 2 cm. long, opposite. Peduncle in specimen examined 24 cm. long, glabrous. Flowers in a corymbose panicle (about 18-flowered). Calyx-teeth 2·8 mm. long, narrow, subacuminate. Corolla-tube somewhat ventricose, ± 1·2 cm. long, lobes rather narrow, just longer than the stamens, about same length as tube. Stamens with bunch of hairs at base of filaments. The leaves in this plant are the same shape as in *C. undulata*, distinctly longer than broad, but smaller; the flowers also are smaller than in that species, the corolla-tube being somewhat ventricose, and the calyx-teeth are narrower.

Differs from both *C. orbiculata* type and *C. virescens* in narrower leaves and smaller flowers; it is distinguished from *C. Beckeri* by having a bunch of hairs at the base of the filaments. Judging from the description, it is closely allied to *C. orbiculata* L. var. *oblonga* DC. = *C. oblonga* Haw.; and *Galpin* No. 5670, from rocky kranses on Nahoon river, East London, doubtfully placed under this variety of *C. orbiculata* L., is also very closely allied to *C. crassifolia* Haw. *C. oblonga* Haw. is only known to us from Haworth's description.

C. virescens, sp. nov. Caulis crassus validus cortice flavescente vel brunneo-flavescente inferne cicatricibus semiteretibus foliorum delapsorum sparse instructus. Folia læte viridia ambitu paullo inæquilateraliter obovata vel late ovata plana vel superne aliquantulum concava basi in petiolum breviter producta apice sæpissime rotundata vel rarius mucronata vel submucronata inter maxima, 10 cm. usque ad 25 cm. longa. Pedunculus crassus glaber, ± 28 cm. longus, multiflorus. Bracteæ ad basin inflorescentia ramorum, 7–8 m. longæ. Flores majusculi corymbosim paniculati penduli vel erecti, pedicellis ·5–4 cm. longis. Calyx ± 6 mm. longus, lobi ± 4·5 mm. longi, triangulares acuti vel ovati subacuminati. Corollæ tubus bene evolutus, ± 25 mm. longus, lobi sub anthesi erecti oblongi vel oblongo-lanceolati acuti, ± 20 mm. longi. Stamina quam corollæ tubus longiora. Squamæ pallide viridi-luteæ, ± 2·5 mm. longæ et 2 mm. latæ. *Cotyledoni orbiculari* et *C. undulatæ* affinis.

Hab. Common in the Kowie bush near Port Alfred, not reaching the immediate neighbourhood of Grahamstown, *Dr. H. Becker.* Flowers July–November.

This species is related to *C. orbiculata* L. and *C. undulata* Haw. The leaves are somewhat concave above, and of a leathery consistence, margin somewhat undulate, upper margin red, otherwise bright green when growing, at the base gradually narrowing to short petiole; sometimes the leaves are about as broad as long, but

generally they are rather longer than broad—the central nerve has generally 3–4 subparallel lateral nerves on each side. Transverse section of corolla-tube in centre is circular, slightly angular along the centre of each petal. Lobes of petals pink inside, all other portions of petals more or less yellowish, with pink shading. Stamens project beyond open flower very little.

Differs from *C. Beckeri*, besides its procumbent growth, thicker and larger leaves, by having the usual tuft of hairs at the base of the filaments. Differs from *C. undulata* Haworth by the leaves being broader in proportion to their length, and narrowing to a greater extent below.

This may be *C. viridis* Haworth in Phil. Mag. 1827, p. 273, a plant only known to us from Haworth's description, in which no reference is made to the flowers. It is omitted by Harvey; we add Haworth's description:—

"C. VIRIDIS. C. (simple, green-leaved) foliis obovato-cuneatis perviridibus, caudice valdè cicatricato.

"Obs. Bipedalis (tertio anno) erecta, caule caudiceve fere simplici, foliorum vestigiis maxime cicatricato; cicatricibus lunulæformibus, lunulis obtusissimis, pallidis, dorso jacentibus; magisque quam in aliis cognitis cotyledonibus profundioribus et conspicuioribus. Folia mediocria; macra (inter affinis) et semper viridia. Cum prioribus sine floribus vigebat ante A.D. 1824."

C. CUNEIFORMIS Haworth in Phil. Mag. 1828, p. 185. There are no specimens of this in the Oxford Herbarium, and it is not mentioned by Harvey. There is a water-colour drawing of foliage and caudex without inflorescence in Herb. Kew. The following is Haworth's description:—"C. brevicaulis; ramosa; foliis confertis obovato-cuneatis mucronatis subfarinoso-albis. Habitat ad Cap B. Spei ubi invenit Dom. Bowie ante ann. 1824. Obs.—Caudex brevis fruticosus valde ramosus. Folia subinde (per culturam) virescent, sed sæpe farinoso-alba. *C. crassifoliæ* nob. similis, at multoties humilior. Flores non vidi."

In the absence of flowers it is impossible to determine this plant. The leaves are not unlike those of *C. hemisphærica*.

C. MUCRONATA Lam. Dict. ii. p. 142 (1786). The following description is drawn up from Mr. Rattray's specimens, which we identify with Lamarck's plant:—Caulis inferne lignosus. Folia cuneato-orbicularia crassa carnosa margine undulata pulverulescentia. Pedunculus ± 12 cm. longus (quum in horto colitur sæpe longior). Inflorescentia in specimine nostro 13-flora. Flores primum penduli? demum erecti. Calyx glaber viridis marginibus angustis albis, calycis tubus 1·25 mm. longus, lobi 4·75 mm. longi, 3·5 mm. lati. Corolla glaber viridi-flava extrinsecus marginibus rubris pentagona superne calycis tubus leviter contracta 3 cm. longa, corollæ lobi 1·3 cm. longi. Filamenta pilis basalibus pallide viridia, circ. 1·5 cm. longa. Squamæ circ. duplo latiores quam longæ pallide flavo-virides.

Hab. Graaff Reinet, *G. Rattray*, No. 18. In flower November and December, 1897.

Leaves of a purplish brown colour, passing into greenish white

towards the stem, and with waxy undulated margins (green and without waxy margin in cultivated specimens). Peduncle becoming much longer when the plant is taken into a garden and cultivated for several years. Corolla greenish yellow, with red margins on outside and inside of lobes, and lobes pencilled red inside, slightly contracted above calyx-tube. Pollen yellow. Carpels the colour of the filaments. Squamæ pale yellowish green, slightly tinged with red.

This is no doubt the plant figured by Burman, tab. 19, fig. 2, as *Cotyledon foliis latis sinuosis in aculeum desinentibus, floribus erectis angustis*, and therefore = *C. mucronata* Lam. It agrees well with the figure, except that the filaments are not so long. *C. mucronata* is one of the species unplaced by Harvey—it was only known to Lamarck from Burman's figure. Its position is clearly close to *C. orbiculata* L.

The specimens of this species in the Albany Museum Herbarium show how necessary it is to be careful not to limit species too narrowly amongst these half-shrubby Cotyledons. To understand this clearly, one must compare the wild specimen collected by Mr. Rattray with the plant after three years' cultivation in Dr. Schönland's garden at Grahamstown. The latter is much more luxuriant, producing many more leaves, a much longer peduncle, and many more flowers. The leaves become greenish and lose their waxy margin, which also becomes rounder at the apex, and less undulate.

C. Galpini, sp. nov. Frutex. Caulis decumbens inferne cicatricibus foliorum delapsorum notatus cortice flavescente. Folia carnosa ambitu oblongo-obovata vel late oblanceolata ad basin attenuata sæpissime erecta facie plana dorso semicircularis glaucescens margine superne rubro opposita vel subopposita apice acuta vel subacuta, 5·0–7·0 cm. longa, 2·0–2·3 cm. lata. Pedunculus cr. 10 cm. longus, in specimine nostro 7-florus (in horto flores multiores sunt et pedunculus usque ad 25 cm. longus attingens). Flores majusculi in paniculam corymbosim dispositi sæpissime penduli. Calycis tubus 1·5 mm. longus, lobi triangulares acuti, 4·5 mm. longi. Flos bene evolutus, 3·5 cm. longus, stamina stylique exserta usque ad 7 mm. Corollæ tubus in sicco ± 2·0 cm. longus, lobi oblongi 1·0–1·2 cm. longi. Squamæ latiores quam longæ pallide flavæ, 4 mm. latæ, 2 mm. longæ.

Hab. Dry mountain sides, Queenstown, *E. Galpin*, no. 2. Alt. 3700 ft. In flower October, 1893.

Allied to *C. undulata* Haw.

Calyx-lobes with green tips, lower down red, pencilled with green. Corolla in transverse section pentagonal, approaching a circle along the angles of the pentagon, red, finally pencilled with pale yellow, as are also the corolla-lobes, otherwise pale yellow—the tube is almost pure yellow on the side towards the stem.

Named in honour of the discoverer, Mr. E. E. Galpin. The measurements of the corolla, &c., in the fresh state are somewhat longer than those stated.

Perhaps the same as the plant distributed by Ecklon & Zeyher as *C. oblonga* Haw.

This plant has been compared with *C. undulata* Haworth, which appears to us to be its nearest ally. The corolla-lobes are broader in *C. Galpini*, and do not taper in the same manner—the leaves are narrower towards the base.

Key to Species allied to C. orbiculata L.*

Lower portion of filaments not conspicuously broadened.
- Leaves orbicular or broadly ovate, often about as broad as long.
  - Stem herbaceous or subligneous.
    - Leaves somewhat glaucous . . . *C. orbiculata* L., type.
    - Leaves light green . . . *C. virescens* Schönl. & Bak. fil.
  - Stem woody. Leaves pulverulescent, purplish brown passing into greenish white towards the stem with waxy undulating margins . . . . . *C. mucronata* Lam.
- Leaves subrhombeo-cuneate or oblong-obovate, distinctly longer than broad.
  - Corolla-tube not conspicuously ventricose, ± 1·7 cm. long, lobes ± 1 cm., lanceolate . . . *C. undulata* Haworth.
  - Corolla-tube not ventricose, 1·7–2·0 cm. long, lobes 1·0–1·2 cm. long, oblong . . . . . *C. Galpini* Schönl. & Bak. fil.
  - Corolla-tube ventricose, ± 1·2 cm. long, lobes about the same length . . . . . *C. crassifolia* Haworth.

Lower portion of filaments broadened, closing the nectar cavity instead of usual hairs.
- Leaves cordate-semiamplexicaul at base . *C. velutina* Hook. fil.
- Leaves not cordate-semiamplexicaul . *C. Beckeri* Schönl. & Bak. fil.

C. velutina Hook. fil. Bot. Mag. tab. 5684. Introduced by Mr. W. W. Saunders from the Cape, by his energetic collector Mr. Cooper. The filaments of the stamens as shown in the figure are dilated below, as in *C. Beckeri*, but we have had no opportunity of dissecting specimens.

C. coruscans Haworth, Suppl. Pl. Succ. p. 21 (1819). *C. canalifolia* Haworth in Phil. Mag. 1825, p. 33. There seem to be more than one species under this name as treated by Harvey in the Fl. Capensis, ii. p. 371.

(a) *C. coruscans* Haworth, Suppl. p. 21. Haworth (Phil. Mag. 1825, p. 33) changed the name to *C. canalifolia*. It is probably the plant figured in the Bot. Mag. tab. 2601, and Bot. Cab. tab. 1030, and there is a specimen agreeing with these in Herb. Albany Museum, collected by W. Kemsley, No. 137, near Port Elizabeth. The following notes are from the type of *C. canalifolia* in the Oxford Herbarium :—Leaves canaliform, margins incurved, in the original description described as being "semipedalibus unciam latis," but the specimens before us do not reach these dimensions. Peduncle 24 cm. long before branching, glabrous, somewhat glaucous,

* We have included in the above key *C. Beckeri* Schönl. & Bak. fil., and the allied *C. velutina* Hook. fil., as the former was placed by Harvey under his *C. orbiculata*.

12-flowered. Flowers in a corymbose panicle, mostly pendulous. Calyx-tube 3–4 mm., lobes deltoid, acuminate, ± 4 mm. long. Corolla-tube ± 2·4 cm. long somewhat ventricose, lobes narrow, shorter than the tube, ± 1·3 cm. long. Stamens longer than the tube, but shorter than the lobes. Anthers rounded.

(b) *C. coruscans* E. & Z., no. 1962. The specimens of this are somewhat fragmentary, those which have been examined being without leaves. The calyx-lobes are shorter the plant of Haworth, being only about 2 mm. long. Corolla 30 mm. long, the lobes are lanceolate, gradually tapering to a point, but do not overlap. Corolla-tube 13 mm. long, that is, much shorter than the preceding. It was collected "in Karoo inter Langekloof et Zwarteberg, in Graaf-reynet, George."

(c) See note on *C. ungulata*.

Plants like *C. decussata* and *C. Flanagani* lose the circular outline of their leaves, and the latter become canaliform in droughts; probably Haworth's *C. canalifolia* did not get sufficient water under cultivation.

C. PURPUREA Thunb. Prod. Pl. Cap. p. 33 (1794). This plant is described by Harvey from specimens collected by Thunberg. Haworth's *purpurea* is a different plant. We have not seen a specimen. It cannot be common near Capetown, as stated by Thunberg. It may be a disguised *C. decussata* or *C. ungulata*.

C. PURPUREA Haworth, Suppl. p. 83 (1819). Haworth gives a diagnosis of this plant, and refers doubtfully to *C. purpurea* Thunb. Prod. p. 83 as a synonym. The other synonyms are—

a. *C. curviflora* Sims, Bot. Mag. t. 2044.
b. *C. squamata caudice*, etc., Burm. Dec. tab. 20, f. 1.
c. *C. frutescens africana*, etc., Comm. Pl. Rar. 23, t. 23.

From an inspection of Haworth's type in the Oxford Herbarium there can be little doubt that it is a monstrous form of *C. tuberculosa* Lam.; it has a solitary flower terminating the scape. It will be noted that Harvey (Fl. Cap. ii. p. 377) considers *C. curviflora* Sims as probably a form of the same species. Haworth's plant has no connection with the *C. frutescens africana*, etc., of Commelin, from which it differs widely both in inflorescence and leaves.

C. TRICUSPIDATA Haworth in Phil. Mag. 1825, p. 32. Type in the Oxford Herbarium. Allied to *C. decussata* Sims. Leaves broadly strap-shaped or oblong cuneate, tricuspid near the apex, 3·0–4·5 cm. long, from ·4–1·4 cm. broad. Peduncle ± 20 cm. long in Haworth's specimen, 12-flowered. Flowers paniculate, mostly pendulous. Calyx-lobes triangular, acute, ± 2 mm. long. Corolla-tube 1·1–1·4 cm. long, lobes narrow lanceolate, acute. Stamens longer than the tube, but shorter than the lobes. Haworth states "that after flowering the leaves have become nearly all entire, but the plant is distinct from *decussata*"; but it will be for the future monographer to decide this point.

This is *C. papillaris* L. *β ? tricuspidata* Salm Dyck in DC. Prod. iii. p. 397.

C. DECUSSATA Sims, Bot. Mag. tab. 2518 (1824). Sims states that this is the *C. papillaris* of Haworth, but not of Thunberg, and that it is also the *Cotyledon foliis angustis*, etc., Burm. Dec. tab. 22, fig. 1, in which opinion we concur. This latter is one of the figures upon which *C. spuria* L. Sp. Pl. ed. ii. p. 614 (1762), Burm. Prod. Fl. Cap. i. p. 13 (1768), is founded.

The following notes are from a specimen communicated by G. Alston from Namaqualand, cultivated in Dr. Schönland's garden:—

Stem more or less upright. Leaves pale green, with dark red tip, subterete, slightly flattened inside, glabrous. Peduncle reddish and calyx pubescent, slightly sticky. Length of open flower ± 2 cm., corolla-tube ± 1·5 cm., corolla-lobes ± 1·3 cm.; calyx-tube 1 mm., calyx-lobes 3·5 mm. Greatest breadth of calyx-lobes 4 mm. Transverse section of corolla in the middle pentagonal, approaching a circle. Corolla along the angles of the pentagon red, otherwise mostly yellowish. Squamæ small, pale yellow, greatest length 1·5 mm., greatest breadth 2 mm.

C. UNGULATA Lam. Encycl. ii. p. 139 (1786). Lamarck quotes for this species Burman, tab. 22, fig. 1, which, as has just been stated, was considered by Sims to be his *C. decussata*. The stem is stated to be frutescent, a foot long. The upper part and branches bear opposite leaves the length of a finger, semicylindrical, channelled on the face, convex on the back, with at the summit a purple semicircular edge. The flowers, according to Burman, are red, pendent, carried on a terminal peduncle, which is branched at the summit.

C. ungulata is figured in DC. Plant. Grasses, tab. 168. Commelin's figure of his *Cotyledon africana frutescens*, etc., tab. 23, one of the plates quoted by Linnæus for his *spuria*, is either identical with or very closely allied to De Candolle's figure.

In order to get further particulars regarding *C. ungulata* Lam., we made application to Mons. Jules Poisson, of the Muséum d'Histoire Naturelle at Paris, who tells us that this plant is not represented in Lamarck's herbarium.

C. Whitei, sp. nov. Procumbens. Caulis brevis internodiis brevissimis. Folia alternantia crassa carnosa oblonga vel oblongo-lanceolata apice acuta dorso rotundata facie applanata glabra sed foliis junioribus delicate cerinis, 5–8 cm. longa, 1·5–2·0 cm. lata. Pedunculus rotundus delicate cerinus in specimine nostro 8-florus, ± 20 cm. longus. Flores in cymam parvam et corymbosam dispositi. Flores penduli. Calycis tubus 2 mm. longus, lobi triangulares acuti, ± 2 mm. longi. Corolla ± 36 mm. longa, gilvo-lutea, basin versus viridescens aliquando rubescens, corollæ lobi ± 15 mm. longi, oblongo-lanceolati, apice oblique acuti demum reflexi. Stamina inclusa. Carpella sursum attenuata. Squamæ ovatæ apice subtruncatæ.

Hab. Brak Kloof, near Grahamstown, *Mrs. G. White*. Flowered Sept. 1897.

Whole plant glabrous, but peduncle, flower-buds, and young leaves with a delicate waxy coating, which is easily rubbed off.

Flowers pendulous in a small somewhat corymbose cyme. Corolla stamens, and carpels of various shades of cream-yellow, greenish towards the basin; last year a reddish tinge was also observed.

Allied to *C. coruscans* Haworth (= *C. canalifolia* Haworth), but this species has larger flowers and a more copiously flowered inflorescence, and the corolla-lobes are narrower. Also allied to *C. ungulata* Lamarck.

C. CANALICULATA Haworth, Suppl. p. 22 (1819). There are no specimens of this species in the Oxford Herbarium, and it is not mentioned by Harvey. The following is Haworth's original description:—"C. (slender, channel-leaved) foliis linearibus semiteretibus alte canaliculatis, caudice erecto subramoso deorsum incrassato, tuberculatim subpapillari e vestigiis persistentibus foliorum. Vigebat in regio horto Kewensi A.D. 1818. Folia viridia collecta subterminalia ut in affinibus, at solum sesquilineam uniformiter lata, et 2–3-lineas longa, a basi ad apicem profundissime concinnique canaliculata."

In the *Index Kewensis* this plant is referred to *C. ungulata* Lam., which, as far as we can judge from the above description, is probably correct.

C. SPURIA L. Sp. Pl. ed. ii. p. 614 (1762); Burm. Prod. Fl. Cap. i. p. 13 (1768). The following is the Linnean diagnosis and synonymy:—

Cotyledon foliis alternis spatulatis carnosis integerrimis.

Cotyledon africana frutescens, folio longo & angusto, flore flavescente. Comm. Pl. Rar. 23, t. 23; Burm. Dec. i, 18, 19, f. 1, and t. 22, f. 1.

Cotyledon africana, foliis depressis cruciatis. Walth. Hort. 16.

There are certainly several species figured in the plates quoted above, as indicated elsewhere. Comm. Pl. Rar. page 23, t. 23, seems to us identical with the plant figured in Pl. Grasses, tab. 168, as *C. ungulata*, and we think the name *C. spuria* ought to be borne by this plant, excluding the other plates quoted.

Commelin's text for this is as follows:—

"Locis saxosis ad Promentorium Bonæ Spei crescit hæc Cotyledon, in his regionibus quivis avulsus ramulis in terram vere aut æstate depactus facile radices agit, læteque crescit, caulis rotundus brevis & viridis statim in ramulos dividitur, qui folia gerit digitum longa, crassa, succulenta & viridia, quorum cacumina nunc rubent, nunc virescunt, ramuli tandem excrescunt in scapum aliquando sesqui pede longiorem, qui in varios pediculos dividitur, è quibus in calyce quinquifido flores dependent monopetali, tubulati, flavescentes & quinquifidi, horum ovæ sursum reflectuntur, & nonnihil rubent, stamina apicibus luteis prædita e flore dependent, fructus ex diversis constat vaginulis, semine fœtis exiguo."

As has already been stated, this figure of Commelin was quoted by Haworth under his *C. purpurea*, but it does not at all agree with his specimen.

C. INTERJECTA Haworth in Phil. Mag. 1828, p. 185. We only know this from Haworth's description:—"C. (fleshy-stemmed) foliis anguste oblongis acutis inflexo-canaliculatis; caudice brevi

valido. Habitat ad Cap. B. Sp. Dom. Bowie, G. H. N. Flores non vidi. Obs.—Caudex teres adhuc 4-uncialis, tuberoso-ramosus carnosus. Folia incurva carnosa glaucescente cinerea triuncialia, quinque lineas lata; subtus convexa, basi semiteretia, sine carina, *C. spuriæ* proxima, sed altior, foliis brevioribus crassioribus angustioribus magisque canaliculatis, et sine dubio incurvis, nec recurvis. In *C. spuria*, folia 4–5-uncias longa petiolo desinentia, 9 lineas lata recurva, et spatulato-lanceolata. Viget in regio horto Kewensi, sed flores non vidi."

This species is omitted by Harvey. It is placed by Haworth in a new section—*Villosulæ*. There is a water-colour drawing of caudex and leaves in Herb. Kew, but in the absence of inflorescence it is at present impossible to determine this species. It may be *C. grandiflora* Burm.

C. RAMOSISSIMA Pl. Succ. Hort. Dyck. p. 12 ex Haworth, Suppl. p. 25 (1819). It is not uncommon near Grahamstown, straggling amongst low bushes. The following notes are from a specimen originally brought to Cape Town by Prof. MacOwan from the Eastern Province. Calyx green, slightly viscoso-puberulous on the outside; tube 3 mm.; lobes 8 mm. long, greatest breadth of lobes 3–4 mm. Corolla glabrous, tube greenish, 15 mm. long. Lobes lanceolate, acute, channelled above, reddish, 18 mm. long. Filaments green below, whitish above, ± 25 mm. long, free portion 20 mm. Anthers yellow. Carpels about 25 mm. long, greenish. Squamæ pale yellow, greenish.

C. Woodii, sp. nov. Frutex ad *C. ramosissimam* arcte affinis differt floribus semper solitariis et ambitu longitudineque corollæ lobi, &c. Caulis teres ramosissimus cortice cinereo glabro. Folia carnosa oblonga vel oblongo-obovata extremitates versus ramulorum aggregata vel subaggregata apice rotundata vel rarius subacuta glaucescentia opposita 1·5 cm.—2·0 cm. longa, 5–7 mm. lata. Flores solitarii ad extremitatem ramulorum dispositi, pedicellis tenuibus ± 1 cm. longis. Calycis tubus ± 2 mm. longus, lobi acuti 1·5 mm. longi. Corollæ tubus 8–9 mm. longus, extus glaucescens, lobi anguste oblongo-lanceolati subacuti ± 1·2 cm. longi. Stamina bene evoluta petalis subæquilonga. Ovarii carpella 5 in stylos filiformes attenuata. Squamæ latiores quam longæ 2·5 mm. latæ, vix 1 mm. longæ.

Hab. Among rocks on banks, Nahoon River, East London, alt. 10–15 ft. Bushy, 3 ft. high. *E. E. Galpin*, no. 5718. In flower, June 4th, 1900.

In *C. ramosissima* Haw. the leaves are broader; it is commonly 2-flowered, and the lobes of the calyx are distinctly longer, but *C. Woodii* is evidently a close ally of this species.

C. PAPILLARIS L. f. Suppl. p. 242 (1781); Thunb. Prodr. p. 83 (1794). This plant was collected at Graaff Reinet in Nov. 1897, by Mr. G. Rattray, and by Mr. E. G. Alston in Namaqualand. It has also been found in carroid places near Grahamstown. The former locality also produced a striking variety, which is subsequently described.

C. Meyeri Harvey is probably a variety of this species, but there are no specimens of this in the Dublin Herbarium, so we are unable to verify this suggestion.

C. papillaris Haworth, Suppl. Pl. Succ. p. 21, is, as stated by Sims and Harvey, *C. decussata* Sims.

C. PAPILLARIS L. f. var. ROBUSTA, **var. nov.** Stem glabrous, slender, decumbent, branches from the base; the branches ascending, simple, with 5–6 pairs of decussate leaves near the base. Leaves fleshy, subterete, flattish inside, green, glabrous, gradually narrower towards the base, more abruptly above, obtuse or more frequently with a distinct brownish mucro, the longest about 6 cm. long, gradually becoming shorter, greatest breadth about 12 mm., depth about 9 mm. Lower internodes 12–20 mm. long, upper smaller. Peduncles slender, terminal, scape-like, with a few leaf-scars, pubescent above, cymose at the apex, few-flowered, 20–25 cm. long. Length of open flower ± 1 cm., beyond which the stamens and styles project 1 cm., length of corolla-tube 8 mm., corolla-lobes 14 mm., calyx-tube 1·5 mm., lobes 3–3·5 mm., greatest breadth of calyx-lobes 3·5 mm. Transverse section of corolla-tube pentagonal, approaching a circle. Calyx and corolla pubescent outside, almost glabrous within. Corolla-tube greenish yellow, lobes dull crimson. Squamæ yellowish green.

Hab. Graaf Reinet, *G. Rattray*, no. 28, Nov. 1898.

C. Flanagani, sp. nov. Caulis erectus vel decumbens inferne cicatricibus foliorum delapsorum notatus cortice flavescente. Folia carnosa alternantia semiteretia glaucescentia superne canaliculata lanceolata ad apicem gradatim attenuata mucronata vel submucronata erecta vel adscendentia 9·0–12 cm. longa vix 1 cm. lata, internodiis 3–4 mm. longa. Pedunculus 25–35 cm. longus, 9–18-florus. Flores nutantes vel suberecti in paniculam corymbosim dispositi. Calycis tubus ± 2 mm. longus, lobi triangulares acuti ± 5 mm. longi. Flos bene evolutus 4·5 cm. longus, corollæ tubus cylindricus ±3·1 cm. longus, lobi oblongo-lanceolati ±2·1 cm. Squamæ parvæ pallide flavæ fere ad apicem bifidæ latiores quam longæ 1·75 mm. longæ, 2 mm. latæ.

Hab. Among shrubs along the Kei River, near Komgha, *H. G. Flanagan*, alt. 1800 ft., no. 1317. In flower, November, 1892. Stormberg, *T. R. Sim*: flowered at Grahamstown, Oct. 1897. Imvani Poort, Distr. Queenstown, *E. E. Galpin*, no. 2531; in cultivation Botanic Gardens, Queenstown.

This species is related in some respects to *C. teretifolia* Thunberg, but flowers are quite different, and the type of this species has hairy leaves. The var. *subglaber* is in Harvey's herbarium, and differs in many respects from *C. Flanagani*. The glaucescent lanceolate semiterete leaves are broadest near the base, from which point they taper gradually to a red tip, which might almost be called a mucro. The transverse section of the corolla in the middle is nearly circular, and on all visible parts the corolla is red pencilled with yellow.

Var. KARROENSIS. Flores in paniculam laxiorem dispositi erecti vel patuli. Calyx 4 mm. longus, calycis lobi 3 mm. longi. Corollæ

tubus ± 16 mm. longus, lobi ± 12 mm. Lobi ad apicem aliquantulum obliqui bifidi et breviter mucronati. Squamæ pallide flavæ latiores quam longæ ± 1 mm. longæ cr. 1·5 mm. latæ.

Hab. From the neighbourhood of Beaufort West, *Dr. H. Becker*. Flowered in Grahamstown, Oct. 1896, and in subsequent years.

Stamens and style slightly exserted in open corolla.

C. TUBERCULOSA Lam. Dict. ii. p. 139 (1786). There can be little doubt that this is the plant figured by Burman, tab. 20, fig. 1. Cotyledon squamato caudice, foliis oblongo-acutis, floribus magnis erectis rubris. It is therefore C. GRANDIFLORA Burm. Prod. Fl. Cap. i. p. 13 (1768), which name antedates Lamarck's. Lamarck makes a var. *β* founded on Burm. tab. 21, fig. 1, which is *C. ventricosa* Burm.; but these plants have by subsequent botanists been considered distinct species.

Recent gatherings of *C. grandiflora* Burm. are :—*R. Schlechter*, no. 7323, from Simonstown, 800 ft., 26. 1. 76. Herb. Austro-Afr. no. 1859. In rupestribus editioribus montis Tabularis pone Capetown, anno 1899. Alt. 3000 ft., leg. *P. Macowan*.

The synonymy seems to be as follows :—

C. GRANDIFLORA Burman, Prod. Fl. Cap. p. 13 (1768).
C. tuberculosa Lam. Dict. ii. p. 139 (1786).
C. curviflora Sims, Bot. Mag. t. 2044 (1819).
C. purpurea Haworth, Snppl. Pl. Succ. p. 23 (1819).

(To be continued.)

THE NOMENCLATURE OF LACHNANTHES.

By James Britten, F.L.S.

A PRONOUNCEMENT on nomenclature contained in a note in the *Gardeners' Chronicle* for 21 Sept. 1901 (p. 227), on the plant which under the above name had lately formed the subject of a correspondence in the *Times*, has induced me to look up the subject, with the following result.

The name for the plant now adopted in Britton and Brown's *Illustrated Flora* (i. 443) is "*Gyrotheca capitata* (Walt.) Morong," with a reference to Bull. Torr. Club, xx. 472. In the Bulletin, Morong cites *Anonymo*—an error for *Anonymos* which has been faithfully copied by all subsequent citers—*capitata* Walt. Fl. Car. 68 [69] (1788) as a synonym for the plant, with the following note :—"*Gyrotheca capitata* (Walt.). It is a little singular that Walter's specific name has been changed into *tinctoria* by all the writers who have quoted him, from Pursh to Kuntze. The plant is placed by Walter among his *Anonymo* [sic] genera, the term he uses when he is doubtful about the genus, but his description is so full that no one can doubt what is meant." This note seems to have been the cause of the subsequent confusion; and it is extremely difficult to understand how Morong came to write it. The

description of *Anonymos capitata* is indeed full, and "no one can doubt what is meant"; at any rate, no one can doubt that *Lachnanthes* is *not* meant—for, to take only one character, the leaves are described as "sparsis, subulatis." On the preceding page Walter describes his *Anonymos tinctoria*—"foliis radicalibus longis, ensiformibus; scapo pedali, villoso, thyrso bracteato terminante": this is unmistakeably *Lachnanthes*: it was recognized as such by earlier authors—*e.g.* Pursh (Fl. Amer. Sept. i. 31), Dryander in Herb. Banks, Bosc, Steudel (Nomencl. ed. 2, ii. 2)—and is cited by Elliot (Bot. S. Car. i. 47) in establishing his genus *Lachnanthes*, which he based on "the minute descriptions of Walter and Michaux compared with living specimens."

American botanists are of course right in taking up Salisbury's name *Gyrotheca* for the genus, as to which the *Gardeners' Chronicle* (*l. c.*) has a curiously misleading sentence: "the name was ignored probably for the very sufficient reason that no description was given, but only the bare name (*nomen nudum*), which gives no right of priority apart from a description or figure." Salisbury (Trans. Hort. Soc. i. 327) quotes the synonyms and descriptions of Michaux, and this effectually disposes of the statement that his name is a *nomen nudum*.

Unfortunately neither *Anonymos* is preserved in Walter's Herbarium, in which, however, there is a specimen of *Lachnanthes* labelled "Nova Genera." His *A. capitata* is correctly referred in the *Index Kewensis* to *Burmannia capitata*, and is cited by J. F. Gmelin (Syst. ii. 107) when establishing the genus *Vogelia* which he proposed for that plant.

The *Gardeners' Chronicle* says that the plant "was introduced to British gardens in 1812, according to Nicholson"; but a reference to Salisbury's paper, quoted above, would have shown that it was introduced by Fraser in 1788.

The synonymy of the plant is:—

GYROTHECA TINCTORIA Salisb. in Trans. Hort. Soc. i. 327 (1812).
Anonymos tinctori [*a*] Walt. Fl. Carol. 68 (1788).
Heritiera tinctorum J. F. Gmel. Syst. Nat. ii. 113 (1791); Bosc in Bull. Sciences Soc. Philom. Paris, no. 19, p. 145 (1799); O. Kuntze, Rev. Gen. ii. 699 (1891) (*tinctoria*).
Dilatris Caroliana Lam. Tab. Encycl. i. 127 (1791).
Heritiera Gmelini Mich. Fl. Bor. Amer. i. 21 (1803).
Dilatris Heritiera Pers. Syn. i. 54 (1805).
Dilatris tinctoria Pursh, Fl. Amer. Sept. i. 30 (1814).
Lachnanthes tinctoria Ell. Bot. S. Carol. i. 47 (1816) et auct. plur.
Camderia Dumorti Anal. Fam. Pl. (1816) 80 (1829).
Anonymo (sic) *capitata* Morong in Bull. Torr. Club, xx. 472 (26 Dec.) 1893; Coville in Mem. Torr. Club, v. 117 (1894); Britton & Brown, Illustr. Flora, i. 443 (1896); non Walt.
Gyrotheca capitata Morong, Coville, and Britton & Brown, *ll. cc.*

I am entirely at one with the criticism of the *Chronicle* on what it styled "the very curious but very unsatisfactory plan of adopting a mutilated name and attributing it (in brackets) to some-

one who could have known nothing about the name; the putting his name in brackets does not obviate the misstatement." In deference to the wishes of some contributors, such a method of citation appears in their contributions to this Journal, but it seems to me unnecessary and reprehensible. The *Chronicle* presupposes that "gardeners" possess an extensive library or a considerable income, when it recommends them "to adopt the nomenclature of the *Index Kewensis*, of the *Genera Plantarum*, and of Nicholson's *Dictionary*." And how if these authorities differ?

SOME NEW SPECIES FROM AUSTRALIA.

By Spencer le M. Moore, F.L.S.

The type-specimens of the species described below are in the National Herbarium:—

Melaleuca (Series Spicæfloræ) **spicigera.** Verisimiliter fruticosa, ramosa, ramis abundanter foliosis cinereo-pubescentibus cito glabris, foliis parvis subimbricatis alternis sessilibus ovatis acutis basi cordatis necnon leviter amplexicaulibus minutissime pubescentibus glandulis paucis comparate magnis eminentibus onustis in sicco saturate smaragdinis, floribus spicatis albis secus ramulos abbreviatos pubescentes apice sæpe foliiferos sublaxiuscule insertos, spicis folia excedentibus plurifloris, calycis pubescentis lobis deltoideis obtusis quam tubus brevioribus, stamineorum fasciculorum ungue petalis subæquilongo, filamentis subpinnatis, ovulis numerosis placentam peltatam coronantibus, fructibus ——.

Hab. West Australia; *Drummond*, No. 122 of 1843 coll.

Folia 0·7–1·0 cm. long., 0·4–0·6 cm. lat., obscure trinervia. Spicæ 1·0–1·5 cm. long., 0·8 cm. diam. Calycis tubus 0·2 cm. et lobi 0·15 cm. long. Petala 0·22 cm. long. Staminum unguis oblongus, 0·17 cm. et filamenta 3·0 cm. long. Stylus 0·63 cm. long.

A very distinct species, by some means overlooked by Mr. Bentham. The leaves are somewhat like those of *M. styphelioides* Sm., an eastern species, by the way, only without their characteristic acumination, but the spikes are quite different. Its place in the genus seems to be near *M. styphelioides*. This is also in the Kew Herbarium.

Tristania Brownii. Verisimiliter fruticosa, foliosa, ramulis patentibus mox omnino glabris, foliis alternis obovatis vel obovato-oblongis obtusis vel etiam emarginatis deorsum in petiolum latum ac brevem sensim desinentibus glabris supra nitidulis ibique elegant er et minute reticulato-nervosis et sæpe in sicco saturate smaragdinis subtus pallidioribus et inconspicue nervosis, cymis paucifloris quam folia brevioribus, floribus ——, calyce fructescente cyathiformi margine 5-undulato vix 5-lobo, capsula magna pro parte libera valvis eminentibus triangularibus obtusis, seminibus quove in loculo circa 7 ala tenui variæ magnitudinis instructis.

Hab. North Australia, Possession Island; *Banks & Solander.* Prince of Wales Island; *Robert Brown.*

Ramuli subteretes, brunneo-rubescentes, in longitudinem rimosi, circa 0·25 cm. diam. Folia 6·0–8·0 cm. long., summum 4·5 cm. lat. (nonnunquam vero usque ad 2·5 cm. angustata); petioli vix 1·0 cm. long. Cymæ 3·0–3·5 cm. long. Calyx fructescens 0·7 cm. long., circa 1·0 cm. diam., in longitudinem paucinervosus; pedicelli circa 0·6 cm. long., puberuli. Capsulæ pars libera ambitu subteres 0·5–0·7 cm. long et 0·6–0·8 cm. diam. Semina ambitu oblonga vel oblongo-obovata, circa 0·5 cm. long. Cotyledones (ex schedis beat. R. Brown) foliaceæ, planæ, late reniformes, convolutæ, una alteram obtegens magnamque partem radiculæ occultans.

A distinct and handsome species, the varying size and shape of whose seeds are worthy of mention. The largest seed of the cell opened by me has a wing only 0·1 cm. in width; in other cases the wing is double as wide or even more. The size of the embryo, too, varies greatly, though perhaps some of these seeds would have been incapable of germination. The leaves and the long projecting valves of the capsules are the chief specific points of the plant.

Some of Robert Brown's specimens of this are also at the Kew Herbarium, having been presented to that institution after the death of J. J. Bennett.

Eugenia (§ Jambosa?) **Banksii** Britten & S. Moore. Fruticosa, glabra, ramulis subteretibus cortice sordide albo obductis, foliis lanceolatis vel lanceolato-oblongis obtusis sæpe breviter cuspidatis deorsum in petiolum latum quam ipsa multo breviorem sensim desinentibus coriaceis supra nitidis subtus pallidis et glandulas nigras minutissimas ostendentibus costis secundariis plurimis utrinque prominentibus parum reticulatis, paniculis terminalibus subdensifloris foliis plerumque subæquilongis, alabastris turbinatis subsessilibus, calycis tubo turbinato hujus parte libera partem adnatam bene excedente lobis 5 brevissimis triangularibus, petalis patentibus, staminibus calyci subæquilongis, bacca ——.

Hab. Queensland, Endeavour River; *Banks & Solander.*

Frutex (ex schedis beat. Solander) bipedalis interdum humanæ altitudinis. Foliorum lamina 5·5–8·0 cm. long., 1·5–2·5 cm. lat., petioli 0·8–1·3 cm. long. Pedunculi secundi ordinis sæpissime 0·5–1·0 cm. long., 3–6-flori. Pedicelli 0·1 cm., calycis pars adnata 0·14 cm., pars libera 0·22 cm. long. Petala ambitu fere circularia, 0·22–0·3 cm. lat. Stamina vix 0·3 cm. long.

This is by no means a good member of § *Jambosa*, on account of the extremely short lobes of the calyx; indeed, when the latter has been thoroughly moistened, the lobes almost entirely disappear. There is, however, no sign of the petals falling off as a calyptra (indeed, Solander in his manuscript description says "petala patentissima"), and this prevents one referring the plant to § *Syzygium*. *E. Banksii* is different from all Australian—and, so far as we have been able to ascertain, Malayan—species of the genus in respect of certain features of its leaves and flowers. The leaves of *E. Bungadinnia* Bailey are *almost* identical; but this is a tree, and although its perfect flowers are still unknown, yet from

measurements given by Mr. Bailey (*Queensland Flora*, p. 662) of remains of the flower in the fruiting stage, it and *E. Banksii* are evidently distinct.

The reserved Plate 122, to be published in the Appendix to Mr. Britten's *Illustrations of the Botany of Captain Cook's Voyage*, will deal with this plant. Communications with reference to it have taken place between Mr. Britten and Mr. Maiden of Sydney, the latter gentleman, after having kindly gone into the matter, pronouncing that the plant is quite unknown to him. As my own investigations at the British Museum and at Kew have been without result in establishing the conspecificity of the Banks and Solander plant with any already known species of *Eugenia*, it has been thought advisable to take the present opportunity of publishing the foregoing description.

Eucalyptus (§ Parallelantheræ) **pastoralis.** Verisimiliter arborea, levis, ramulis subteretibus cortice tenero subfusco laxiuscule obductis, foliis sparsis magnis sat longe petiolatis late rotundato-ovatis obtusissimis basi latissima paullulum obliquis coriaceis crebro glanduloso-punctatis costis secundariis pluribus patentibus costa intramarginali a margine parum remota, umbellis axillaribus vel lateralibus 2–5-floris, pedunculis abbreviatis subquadrangularibus, pedicellis fere evanidis crassiusculis, alabastris majusculis subsphæroideis, operculo hæmispherico obtusissimo calycis tubo breviore, staminibus omnibus fertilibus ante floritionem infractis, antheris oblongo-ovatis, stigmate stylo latiore.

Hab. Adelaide River, North Australia; *Rev. T. S. Lea*, July, 1886. "White Gum."

Foliorum lamina sæpissime 13·0–16·0 cm. long., summum vix totidem lat.; petioli crassiusculi, late canaliculati, sursum anguste alati, 4·0–4·5 cm. long. Pedunculi circa 0·6 cm. long., 0·35 cm. diam. Alabastra 1·2 cm. diam. Calycis tubus 0·7 cm. long., summum 1·2 cm. lat., una cum operculo nitens et eleganter rugatus. Operculum 0·5 cm. long., 1·0 cm. diam. Stamina 1·2 cm. long.; filamenta in sicco aurantiaca; anthera 0·1 cm. long. Capsula ——.

Near *E. platyphylla* R. Br. and *E. alba* Reinw. The leaves are almost exactly those of the former, but in either case the buds and opercula are much smaller than those of *E. pastoralis* and differently shaped. At the British Museum there is a specimen, sent under the name of "*E. alba* Reinw." by Baron Mueller, which has large flowers with a broad hemispherical very obtuse operculum almost exactly like that of *E. pastoralis*. Tnis is altogether unlike typical *E. alba* Reinw., and may perhaps be a small-leaved form of the species described above.

Stylidium (§ Nitrangium Series Thyrsiformes) **gypsophiloides.** Glabrum, foliis cæspitosis sat elongatis angustissimis longe acuminatis basi vaginantibus rhizomata brevia tetragona coronantibus, paniculis effusis multifloris rigidis, floribus sessilibus luteis, calycis tubo elongato lineari sursum parum angustato limbi subactinomorphi lobis abbreviatis oblongo-ovatis obtusis margine anguste membranaceis, corollæ tubo tenui calycis limbo æquilongo faucibus appendicibus subulato-setaceis onustis lobis spathu-

lato-obovatis obtusissimis posticis quam laterales longioribus labello abbreviato quadrato cruribus 2 setaceis sat elongatis instructo, capsula adhuc cruda lineari.

Hab. West Australia, Murray District; *E. Pritzel*, No. 116.

Folia summum 0·05 cm. lat., modice 5·0–6·0 cm. long., exstant vero specimina nana quorum folia extra 1·5 cm. long. vix egrediuntur. Paniculæ usque ad 15·0 cm. diam., sed sæpe angustiores. Calycis tubus sæpissime 0·7–0·9 cm. long. et 0·03 cm. diam., ipso sub limbo pilis paucis glandulosis onustus, limbi lobis 0·1 cm. long. Corollæ faucium appendices circa 0·12 cm. long.; lobi laterales 0·2 cm. postici 0·3 cm. long., illi summum 0·17 cm. lat. hi 0·23 cm.; labellum 0·06 cm. long., hujus appendices 0·2 cm. long. Columna 4·5 cm. long. Capsula valdo immatura 1·0 cm. long.

A species with much the general appearance of *S. canaliculatum* Ldl., next to which I am of opinion that it should be inserted in the genus. The long and narrow leaves attenuated above, the effuse panicles, sessile yellow flowers, long slender calyx-tube and short and broad and blunt calyx-lobes, the spathulate corolla-lobes, short quadrate labellum with its appendages, and the setaceous appendages upon the throat of the corolla, are the main features by which it can at once be distinguished from *S. canaliculatum*.

Eremophila (§ Stenochilus) **calycina.** Caule dense folioso mox ex speciminis siccis foliorum evanidorum indiciis onusto fulvo-pubescente, foliis sessilibus lineari-lanceolatis acutis breviterve acuminatis minutissime puberulis glandulis parvis immersis dense obsitis, pedunculis calyce paullo brevioribus fulvo-pubescentibus, calycis magni saltem deorsum pubescentis glandulosi post florationem amplificati et tunc conspicuius nervati lobis inter se inæqualibus lobo postico majori latissime ovato cuspidulato lobis reliquis oblongo-ovatis vel obovato-oblongis acutis, corollæ extus puberulæ lobo antico late oblongo lobis reliquis ovatis acuminatis, staminibus longe exsertis, ovarii loculis 2-ovulatis.

Hab. Near the head of St. Vincent's Gulf; *Mrs. Capt. Grey.*

Folia 2·5–3·0 cm. long., 0·5–0·6 cm. lat. Pedunculi circa 0·8 cm. long. Calyx florescens in toto circa 1·5 cm. long. et lat., fructescens circa 2·0 cm. lat. Corolla tota circa 2·5 cm. long.; hujus tubus ima basi 0·4 cm. diam. inde sensim usque ad 0·5 cm. diam. ampliatus et nunc (sc. ad alt. 0·6 cm. supra basin) ad 0·4 cm. subito contractus unde iterum sensim usque ad 1·0 cm. dilatatus; fauces pilosi; limbi lobus anticus 0·7 cm. long., lobi intermedii 0·45 cm. et antici 0·35 cm. long. Filamenta 2·5 cm. long., crassiuscula. Ovarium glabrum. Capsula ——.

Nearest *E. Duttoni* F. Muell., but with somewhat shorter and more crowded leaves not markedly contracted at the base, peduncles shorter than the larger and differently shaped calyx, &c.

Hemigenia (§ Homalochilus) **Pritzelii.** Suffruticosa, ramosa, glabra, ramis ramulisque foliosis tetragonis, foliis subsessilibus oblanceolato-oblongis mucronulatis tenuiter membranaceis in sicco læte viridibus, pedunculis quam folia brevioribus gracilibus superne bibracteatis, bracteis setaceo-subulatis acuminatis, calycis fructi-

ficando paullo aucti labio superiore integro ovato-rotundato breviter acuminato labio inferiore ovato-oblongo bidentato dentibus triangularibus acutis, corollæ tubo calyci subæquilongo intus piloso labio postico quam anticum breviore breviter lobato labio antico lobis lateralibus late oblongis obtusissimis lobo intermedio obovato emarginato, antherarum omnium connectivo deorsum breviter barbellato.

Hab. West Australia, Darling Range, in Wellington District; *E. Pritzel*, No. 196.

Folia modica circa 2·5 cm. long., 0·8 cm. lat.; costa centralis subtus paullo eminens, costæ laterales inconspicuæ. Pedunculi circa 0·7–0·9 cm. long. Bracteæ 0·4 cm. long. Calycis florescentis tubus 0·2 cm. long., in longitudinem nervosis; labium anticum 0·22 cm. lat., hujus dentes 0·07 cm. long. Corollæ tubus 0·4 cm. long.; labii postici lobi ciliolati, 0·15 cm. long.; labii antici lobi laterales 0·3 cm. et lobus intermedius 0·35 cm. long. Nuculæ 0·12 cm. diam., rugosæ, pallide brunneæ.

Distributed as *H. rigida* Benth., from which it differs in respect of its leaves, setaceous bracts, and shortly toothed lower lip of calyx, among other points.

Reference has been made above to plants collected in Western Australia by Herr E. Pritzel, who is, I presume, still engaged in the botanical exploration of that country. In a parcel of these plants which reached the British Museum a few weeks ago, I noticed the following few oversights in nomenclature, and, as other subscribers may not be in so favourable a position for correctly determining Australian plants as we in England are, they may be glad to have these corrections, which are as follows, the names within inverted commas being those under which the specimens have been distributed:—

No. 52. "*Aster*" is *Brachycome iberidifolia* Benth.
,, 64. "*Eremophila* sp. nov." is *E. Drummondii* F. Muell.
,, 84. "*Melaleuca incana* R. Br." is *Kunzea ericifolia* Reichb.
,, 88. "*Podolepis aristata* Benth." This is the var. *minor* of that species.
,, 96. "*Stylidium longitubum* R. Br." is *S. utricularioides* Benth.

While on the subject of Australian plants, one may perhaps be allowed a few words about the collections made by James Drummond in the early days of what was then called the "Swan River Settlement." The most complete of Drummond's sets is in the Herbarium at Kew; that at the British Museum is not quite so good. There is, however, one unfortunate feature which detracts from the value of Drummond's work as represented at Kew, and that is the occasional uncertainty as to the number, more often as to the year of collection of a given specimen. In the early days of the Kew Herbarium, collectors' labels were often destroyed, sometimes without so much as inscribing the numbers upon the sheets. In Drummond's case the year of collection has been more often omitted than the number.

They managed things better at the Museum, where Drummond's original labels have been carefully preserved. It is therefore unfortunate that Mr. Bentham, while writing the *Flora of Australia*, did not glean the necessary information in respect of Drummond's plants from the senior institution, since, by trusting in the haphazard method pursued at oldtime Kew, he has committed many blunders which must have been a fertile source of embarrassment and error to subscribers to Drummond's sets abroad.

HEPATICS OF YORKSHIRE AND DURHAM.

By Wm. Ingham, B.A.

It may interest students of British Hepatics to know the following habitats where I have found the various Hepatics mentioned. I am much indebted to Mr. Macvicar for kindly verifying almost every plant named in this list, and to Mr. Pearson and Mr. Slater, of Malton, for their kind additional help in the case of a few of the plants.

To economize space, I have omitted the commoner Hepatics that are generally distributed throughout the various vice-counties mentioned. The order followed is that of the *Catalogue of British Hepaticæ* used by the Moss Exchange Club. The vice-county numbers placed after the various habitats are as follows :—

61 ..... South-east Yorkshire.
62 ..... North-east Yorkshire.
63 ..... South-west Yorkshire.
64 ..... Mid-west Yorkshire.
65 ..... North-west Yorkshire.
66 ..... Durham.

Frullania tamarisci L. A fine large growth, with perianths, on the face of the White Force, Teesdale (65), June, 1897; and another specimen from Widdy Bank, Teesdale (66), with the stipules less hooded than usual, June, 1897.

Lejeunea hamatifolia (Hook.). On vertical limestone cliffs by the side of Ireshope burn, Durham (66), July, 1898.—*L. patens* Lindb. With perianths, on large blocks of stones by the R. Wharfe, Bolton Woods (64), Aug. 1898.

Porella rivularis Nees. High Force, Durham (66), June, 1897.

Blepharozia ciliaris (L.). On Skipwith Common (61) in plenty, March, 1897; on Widdy Bank, Teesdale (66), June, 1897; and on Barmby Moor in East Yorkshire (61), Dec. 1900. — *B. pulcherrima* (Hoffm.). On the base of an old tree, Castle Howard (62), April, 1897.

Blepharostoma trichophyllum (Dill.). On large loose stones by the river-side, Arncliffe Wood, North Yorkshire (62), May, 1897, *c. fr.*; by the Strid, Bolton Woods (64), with perianths, Aug. 1897; on limestone rocks by Ireshope burn, Durham (66), July, 1898.

Lepidozia setacea (Web.). On Widdy Bank, Teesdale (66), June, 1897.

Kantia Sprengelii (Mart.). On Skipwith Common (61), March, 1897; and in Arncliffe Wood, North Yorkshire (62), May, 1897.—*K. arguta* (Mart.). In Castle Howard Quarry (62), April, 1897.

Cephalozia lunulæfolia Dum. On detached rocks, Arncliffe Wood (62), Aug. 1900.— *C. Lammersiana* (Hüben.). A very fine growth, the var. *grandifolia* Spruce, on dripping rocks, Arncliffe Wood (62), May, 1897. — *C. Lammersiana* (Hüben.), type. Strensall Common (62), June, 1897; Arncliffe Wood (62), May, 1897, on wet bank by the river; White Force, Teesdale (65), June, 1897; Skipwith Common (61), May, 1897; Coatham Marshes (62), May, 1900; Barmby Moor (61), Aug. 1900. — *C. connivens* (Dicks.). Strensall Common (62), May, 1897, on rotten wood, *c. fr.*; Skipwith Common (61), July, 1897; Leckby Carr (65), Sept. 1898.—*C. fluitans* (Nees). Mixed with *Drosera anglica*, Leckby Carr (65), Sept. 1898. — *C. divaricata* (Sm.). Barmby Moor (61), Aug. 1900. — *C. stellulifera* Tayl. In fine fruit, on rotten sticks and leaves, Barmby Moor (61), Aug. 1900.—*C. dentata* (Raddi). Very probably this, but too young to be certain, on bare peaty ground, Skipwith Common (61), Oct. 1899.

Scapania resupinata var. *major*. On rocky side of stream, Reeth (65), Aug. 1900; on vertical rocks by River Wharfe, Bolton Woods (64), Aug. 1900,—the male plant.—*S. subalpina* (Nees) var. *undulifolia*. By the side of Burnhope burn, Durham (66), July, 1898. Mr. Macvicar says about this: "A most interesting plant, and very distinct as to the variety, being just like the figure in Husnot, copied from Gottsche in Rab. Hep. Eur. No. 465." This hepatic appears to be new to England. — *S. nemorosa* (L.). In fine fruit, Arncliffe Wood (62), May, 1897.—*S. intermedia* Husn. On vertical faces of stones, Arncliffe Wood (62), May, 1897; Bolton Woods (64), *c. per.* Sept. 1900; Widdy Bank (66), June, 1897.—*S. irrigua* (Nees). Skipwith Common (61), Mar. 1897; Jackdaw Crag Quarry, Tadcaster, Sept. 1897,—in this case, strange to say, mixed with *Ditrichum flexicaule*. — *S. convexa* (Scop.). Arncliffe Wood (62), May, 1897, on detached blocks of stone; Castle Howard (62), April, 1897.

Diplophyllum albicans var. *vittata* Nees. On Holwick Fell, Teesdale (65), June, 1897.

Lophocolea cuspidata Limpr. Arncliffe Wood (62), Aug. 1900; Strid, Bolton Woods (64), Aug. 1900.

Harpanthus scutatus (Web. & M.). On vertical sides of detached stones, Arncliffe Wood (62), May, 1897.

Mylia Taylori (Hook.). Very fine on Burnhope Seat (66), July, 1898; Leckby Carr (65), Sept. 1898; Skipwith Common (61), May, 1897; Widdy Bank (66), June, 1897.—*M. anomala* (Hook.). Goathland Moor (62), Aug. 1897.

Plagiochila interrupta Nees. In fine condition, with perianths, on rocky ledges among sand deposited by the river Wharfe, Bolton Woods, Aug. 1900. — *P. asplenioides* var. *heterophylla* Nees. By Burnhope burn (66), June, 1898.—Var. *major* Carr. Helmsley (62), Dec. 1896; Cowshill, by a waterfall (66), July, 1898.—Var. *Dillenii* Tayl. Holwick Fell (65), June, 1897; Bolton Woods (64), Aug.

1898; High Force (66), June, 1897; Reeth (65), Aug. 1900; White Force (65), Aug. 1897. — *P. spinulosa* (Dicks.). A curious and rigid form, *c.per.*, Holwick Fell (65), June, 1897.

Jungermannia cordifolia Hook. Cowshill (66), July, 1898, by waterfall; Ireshope burn (66), July, 1898; Holwick Scar (65), June, 1897; High Force (66), June, 1897. — *J. turbinata* Raddi. Burghwallis (63), Nov. 1899, on damp shady side of road; Jackdaw Crag Quarry, Tadcaster (64), in fine fruit, June, 1900; Boston Spa (64), *c.fr.*, April, 1897; magnesian limestone quarry, Knottingley (63), *c.per.*, Oct. 1898; Byram Quarry, Ferrybridge (63), *c.per.*, Sept. 1900; Wentbridge (63), on side of cutting through the limestone on the North Road, Nov. 1900. This hepatic is quite characteristic of the old magnesian limestone quarries, and grows on ledges in shady places. — *J. riparia* Tayl. On limestone cliffs by Ireshope burn (66), July, 1898; Boston Spa, by the side of the Wharfe (64), April, 1897; Falcon Clints, Teesdale (66), July, 1898; by Waterfall, Cowshill (66), July, 1898; by the Strid, Bolton Woods (64), Aug. 1900; on ledges of magnesian limestone quarry, Aberford (64), Dec. 1900.—*J. sphærocarpa* Hook. On wet rock by river side, Arncliffe Wood (62), *c. per.*, Aug. 1900. — *J. Floerkii* Web. & Mohr. On Burnhope Seat (66), July, 1898; on Holwick Scar (65), June, 1897,—a fine form, approaching *J. gracilis;* by the side of the top of Weardale Road into Teesdale (66), July, 1898; by Farngill, Reeth (65), Aug. 1900; on Widdy Bank, Teesdale (66), June, 1897.—*J. barbata* Schmid. By Burnhope burn (66), July, 1898; White Force, Teesdale (65), June, 1897; Holwick Scar (65), June, 1897. — *J. barbata* var. *Schreberi* Nees. By Burnhopeburn (66), July, 1898. — *J. Lyoni* Tayl. White Force (65), June, 1897; Holwick Scar (65), June, 1897. — *J. gracilis* Schleich. On loose stone by tke Strid, Bolton Woods (64), Aug. 1898.—*J. incisa* Schrad. On rocks by Punchard Gill, Arkengarthdale (65), Aug. 1900; on wet rocks by river, Arncliffe Wood (62), Aug. 1900. — *J. bicrenata* Schmid. On the floor of quarry, Castle Howard (62), *c.per.*, April, 1897.—*J. porphyroleuca* Nees. On stone by river side, Kirkham (62), March, 1898; Wearhead (66), *c.per.*, July, 1898; Widdy Bank (66), *c.fr.*, June, 1897.—*J. ventricosa* Dicks. On rock by Strid, Bolton Woods (64), with abundant perianths, Sept. 1899; Castle Howard Quarry (62), April, 1897; Holwick Scar (65), June, 1897; Ryhill (63), Nov. 1899; on Barmby Moor (61)—a tall, lax, creeping form, among decayed leaves and sticks—Aug. 1900. — *J. bantriensis* Hook. White Force (65), June, 1897; on Widdy Bank (66), July, 1898.—*J. gracillima* Sm. On floor of Castle Howard Quarry (62), April, 1897.

Eucalyx hyalina Lyell. On wet shady bank of river, Arncliffe Wood (62), May, 1897; by Sedling burn, Wearhead (66), July, 1898.—*E. obovata* (Nees). White Force (65), Aug. 1898; Widdy Bank (66), *c.fr.*, June, 1897.

Nardia compressa (Hook.). By Burnhope burn (66), July, 1898; on wet rock, Arncliffe Wood (62), May, 1897. — *N. geoscyphus* De Not. In very fine condition for fruit, Strensall Common (62), March, 1897.

Marsupella ustulata Spruce. Castle Howard Quarry (62), *c. fr.*, April, 1897.—*M. robusta* Lindb. White Force (65), June, 1898.

Fossombronia Dumortieri Lindb. In abundant fruit, Skipwith Common, in dried-up ditch (61), Sept. 1900. — *F. cristata* Lindb. By side of old pool near the R. Foss, York (62), in fine fruit, Sept. 1898.

Petalophyllum Ralfsii (Wils.) Gottsche. On Coatham Marshes (62), May, 1901. Since I recorded this hepatic in the *Journal of Botany*, Mr. E. M. Holmes, of Sevenoaks, Kent, has also found it and the *M. hibernica* on Coatham Marshes.

Mörckia hibernica (Hook.). On Coatham Marshes (62), Sept. 1898, and again with abundant capsules, May, 1901. All the capsules had disappeared a month later, in June, 1901.

Blasia pusilla (L.). On wet rocks, Mallyam Spout, Goathland (62), Aug. 1898; Saltburn, by river side, Sept. 1897; White Force (65), Aug. 1898; Filey, on wet cliffs (61), Aug. 1897.

Pellia calycina Tayl. Strensall Common (62), by side of old pool, *c. fr.*, April, 1900; on damp rocky ledge of quarry, Aberford (64), Sept. 1900. — *P. Neesiana*. On dripping rocks in company with *Sphagnum squarrosum* var. *spectabile* Russ., *S. recurvum* var. *mucronatum* Warnst., and *S. subnitens* var. *virescens* forma *squarrosula*, Arncliffe Wood (62), Sept. 1901, and Aug. 1900,—the male plants only.

Aneura latifrons Lindb. On damp shady ledge of magnesian limestone quarry, Brodsworth (63), March, 1897; on similar ledges in quarry, Knottingley, April, 1900 (63); in quarry near Aberford (64), Dec. 1900. This hepatic, like *J. turbinata*, is a characteristic one of the damp shady ledges in old magnesian limestone quarries. —*A. sinuata* (Dicks.). By side of pool, Strensall (62), March, 1897, *c. fr.*, associated with *P. calycina*. — *A. pinguis* (L.). On Coatham Marshes (62), *c. fr.*, May, 1901; Castle Howard (62), April, 1897, *c. fr.*—Var. *angustior*. Widdy Bank (66), July, 1898.

Metzgeria pubescens (Schrank). On vertical limestone cliffs, Ireshope burn (66), July, 1898; on similar cliffs by the Strid, Bolton Woods (64), Aug. 1897; Cowshill (66), July, 1898; White Force (65), June, 1897.—*M. conjugata* Lindb. On rocks, Arncliffe Wood (62), May, 1897.

Marchantia polymorpha L. A small, pale green form with very narrow fronds and male hats, whose true position is at present *sub judice*, on dry sandy bank, Coatham Marshes, May, 1901.

Chomiocarpon quadratus (Scop.). In fine fruit on Coatham Marshes (62), June, 1901; White Force (65), *c. fr.*, Aug. 1898; Falcon Clints (66), June, 1897; on rocky ledges, Jackdaw Crag Quarry, Tadcaster (64), *c. fr.*

Ricciella fluitans (L.). On edge of pool, Askham Bog (64), Nov. 1896.

Ricciocarpus natans (L.). Selby (61), Oct. 1896; very abundant in pool, Appleton Roebuck (64), Nov. 1899; and abundant in R. Foss, York, June, 1900.

SOME MALAY AROIDS.

By H. N. Ridley, M.A., F.L.S.

Cryptocoryne pontederiæfolia Schott. This was described (Ann. Mus. Lugd. Bat. i. 122) from a fruiting plant obtained in Sumatra, and was figured in Engler's *Araceæ exsicc. et illustr.* no. 24. A plant in flower collected by a native collector between Gunong Pulai and Johor-town, in the State of Johor, is, without doubt, as Dr. Prain pointed out, this little-known species. The leaves are ovate-cordate, with distinct auricles and undulate edges, 2 in. long, and 1½ in. wide, the petioles 3 in. long, and sheathing for one-third of their length. The scapes are very short; the spathes have a stout tube 4 in. long, dilated at the base, and an ovate limb 1½ in. long, and ending in a tail 5 in. in length. The limb is of a deep purple colour.

Pistia Stratiotes L. Though of world-wide distribution, this is very doubtfully wild in the Malay Peninsula. It is cultivated by the Chinese for feeding pigs, and is carried about by them for that purpose. I found it floating down the Batu Pahat river (Johor) in considerable quantities, but on reaching the tidal portion of the river as soon as the water was the least saline it died and rotted away.

Alocasia longiloba Miq. This is apparently the oldest name for the very common and widely distributed species, known to the natives as Keladi Rimau and Keladi Ular, "tiger caladium," and snake caladium, on account of its banded petiole. It is common all over Singapore, Johor, Malacca, Perak, and nearly as far north as I have been, occurring also in Luigga Island and Borneo. As like many other aroids it varies very much in size and form of leaf, and various forms have been in cultivation under different specific names. *A. singaporensis* Linden. *Gartenflora*, xiv. 252, is doubtless this common plant. *A. denudata* Engler, based on a leaf collected by Gaudichaud in Singapore, is probably also this species, but both description and specimen are worthless for identification. The leaves, which are usually sagittate with long lobes, in seedlings are quite entire and peltate, like the adult leaves of *A. Beccarii* Engler. *A. Lowii* Hook. fil., a well-known cultivated plant from Borneo, occurs also in the Malay Peninsula at Kwala Dipang; and in Selangor, on the limestone rocks near Kwala Lumpur.

Homalomena singaporensis Regel, Ind. Sem. Hort. Petrop. (1869), 18. Plants cultivated at Kew under this name which seem to agree with a type in the Kew Herbarium are identical with a plant which has been cultivated in Singapore for very many years, but has never been obtained wild by any collector. It is said to have come from India.

H. (Chamæcladon) **Curtisii**, sp. n. Caulis brevis erectus, foliis lanceolatis obliquis acuminatis nutantibus flaccidis, 4–5 pollices longis, 1–1½ pollicis latis, atroviridibus vel atrorubentibus, petalis

gracilibus, 3–4 pollices longis. Spathæ pedunculis ½ pollicis longis, rubris, oblongæ cuspidatæ, ¾ pollicis longæ. Spadices stipitati, parte mascula feminea longiore, floribus 3–4 lobis, flores feminei pauci circiter 10, iis *H. angustifoliæ*, majoribus staminodiis clavatis.

Perak, Bujong Malacca (*Curtis*).

A pretty plant with weak nodding leaves of a deep red colour. The form of the leaves and the few female flowers distinguish it from its allies, *H. angustifolia* and *H. consobrina*.

H. argentea, sp. n. Caulis circiter pollicem longus. Folia oblique lanceolata inæquilatera basi rotundata apice acuto, 3 pollices longa, 1¼ pollicis lata, argentea, nervis pluribus, petiolis 2 pollices longis, rubris. Spathæ brevi-pedunculatæ lanceolatæ striatæ haud cuspidatæ, ½ pollicis longæ, rubræ. Spadices breviores haud stipitati, parte mascula alba ter longiore quam feminea; flores feminei perpauci tenues latæ, rubro punctati, stigmatibus parvis subtriangularibus, staminodiis magnis clavatis.

Malacca. I have had this in cultivation for many years. It was first collected alive by Mr. Derry. The species is closely allied to *H. Griffithii* Hook. fil., a very common and variable species, but the male portion of the spadix is three times as long as that of the female, and the female flowers are very few, whereas the females are much more numerous in *H. Griffithii*.

H. falcata, sp. n. Rhizoma crassum radicibus crassis lanuginosis. Folia plura congesta petiolis 3–7 pollices longis, triente vaginantibus, purpureis, laminis oblique lanceolatis falcatis acuminatis basibus cuneatis, 5 pollices longis, 1¼ pollicis longis, nervis primariis 12, herbaceis. Spadices plures pedunculis 1–2 pollices longis, validulis. Spathæ oblongæ, cuspidatæ, 1½ pollicis longæ. Spadix stipitatæ, parte mascula cylindrica feminea ter longiore.

Kedah, at Yan, on rocks by a stream.

Allied to *H. Griffithii* Hook. fil., but the leaves are distinctly falcate, and the beak of the spathe is longer and curved, and the spadix stipitate.

H. PUMILA Hook. fil. Flor. Brit. India, vi. p. 535. The type of this, collected by Maingay in Singapore, is evidently the very common little plant which grows in the rocky ravines in the Malay forests. The leaves are usually bright green, sometimes silvery, or again deep red. It occurs in Singapore, Johor, Malacca, Java, and Borneo (Kina-balu, *Burbidge*), and is *Chamæladon lanceolatum* Miq. Flor. Ind. Bat. iii. 212, t. 40. *C. pygmæum* Engler, Monogr. Arac. p. 345, *Aglaonema pygmæum* Hassk. Hort. Bogor, 1844, p. 57. The red-leaved variety (var. *purpurascens* mihi) is *Homalomena purpurescens* Hook. fil. *ll. cc.* *Chamæladon purpurascens* Schott. *Bonplandia*, 1858, p. 369. It grows with the green form, but is less abundant.

H. propinqua, sp. n. Caulis brevis validulus, folia elliptica obliqua acuta basi rotundato, 6 pollices longa, 2½ pollices lata, nervis primariis 14, petiolis 3–4 pollices longis, scapi breves copiosi, pedunculis gracilibus, ½ pollices longis, spathæ angustæ, acutæ,

¾ pollicis longæ, spadices graciles haud stipitati parte mascula ter longiore quam feminea, flores feminei perpauci.

Johor, on Gunong Pulai (no. 3722).

This is allied to *H. pumila* Hook. fil., but much larger in all its parts. It resembles *H. nutans* Hook. fil. in habit, but has the spathes and spadices of *H. pumila* Hook. fil.

H. multinervia, sp. n. Rhizoma crassum radicibus longis et crassis, folia plura erecta, petiolis 6 pollices longis, basi pollice vaginantibus, laminis lanceolatis acuminatis acutis falcatulis, 6 pollices longis, 1½ pollicis latis, nervis primariis 6–8 vix distinctis, secundariis copiosis approximatis, spathæ in pedunculis validis, 1½ pollicis longis, oblongæ cuspidatæ, ½–⅔ pollicis longæ. Spadices breviter stipitatæ, partibus masculis et femineis ferme æqualibus, staminodiis nullis.

Malacca. In woods at the base of Mount Ophir.

This is allied to *H. Griffithii* Hook. fil., but has a very stout creeping rhizome and very long petioles to the leaf. There are apparently no staminodes (abortive flowers) among the female flowers.

H. mixta, sp. n. Rhizoma crassum. Folia longe petiolata, lamina elliptica vel oblanceolata, 9 pollices longa, 3 pollices lata, cuspidata subherbacea, nervis primariis 10, secundariis pluribus ferme æque prominulis, petiolis validis, 6 pollices longis, ad ⅙ longitudine vaginantibus. Spathæ plures circiter 11, pedunculis gracilibus, 3 pollices longis, oblongæ breviter cuspidatæ pollicem longæ; spadices breviores, parte mascula cylindrica acuta ter quam feminea longiore, floribus femineis abortivis inter masculis mixtis. Flores feminei plures, stigmatibus discoideis, ovulis pluribus.

Pahang. Tahan Woods.

This plant is especially remarkable for having a number of abortive flowers mixed in with the males in the male part of the spadix. They appear to be abortive females.

H. crassa, sp. n. Caulis crassus brevis pollicaris, radicibus validis. Folia carnosula elliptica mucronata basi rotundata, 5 pollices longa, 2 pollices lata, petiolis 3 pollices longis, dimidio vel ultra vaginante, vaginis latis, ½ pollicis ad bases. Spathæ paucæ, pedunculis pollicem longis, crassæ rostratæ, 1¼ pollicis longæ. Spadix haud stipitata pollicaris, parte mascula feminea æquali cylindrica obtusa. Flores feminei ovoidei, stigmatibus discoideis.

Selangor. Ginting Peras; Kajang.

A stout short plant, with very thick short petioles sheathing for one-half or two-thirds of their length.

Schismatoglottis marginata, sp. n. Caulis crassus ferme lignosus, radicibus crassis. Folia lanceolata acuminata in petiolo angustata, marginibus undulatis, 3–6 pollices longa, 1–2 pollices lata, nervis primariis circiter 10 ascendentibus, petiolis 2–3 pollices longis, triente vaginantibus, vaginis crispis. Spathæ 1¾ pollicis longæ, basi angustatæ, cuspidatæ, pedunculis ½ pollicis longis. Spadix 1½ pollicis longa, apice cylindrico masculo pollicem longo,

infra parte angustata floribus sterilibus tecta, parte feminea brevi pauciflora. Semina oblongo-elliptica costata.

Pahang. Tahan river.

S. longifolia, sp. n. Caulis brevis. Folia elliptica oblanceolata vel lanceolata mucronata in petiolis attenuata, 6–12 pollices longa, $1\frac{1}{2}$–$3\frac{1}{2}$ pollices lata, nervis tenuibus ascendentibus, mucrone ultra $\frac{1}{2}$ pollicis longo, petiolis 6–15 pollices longis. Scapi plurimi pedunculis gracilibus, 5–12 pollices longis. Spathæ cylindricæ angustæ, haud contractæ in medio, 2 pollices longæ, rostro gracili, $\frac{1}{2}$ pollicis longo. Spadix gracilis ultra pollicaris haud stipitata, apice cylindrico sterili ferme $\frac{1}{2}$ pollicis longo, parte mascula brevi, floribus oblongis; parte sterili brevi, floribus abortivis; parte feminea $\frac{1}{4}$ pollicis longa. Spatha in fructu basi angustata superne gradatim incrassata, pollicem longa. Semina oblonga, $\frac{1}{8}$ pollicis longa, costata.

Perak. Thaiping Hills (*Curtis*, 2082) (King's collector, 1967).

Dr. Prain, in a note on the specimen collected by Dr. King's collector, calls it *S. Rhynchopyle*, and says it is extremely near *Rhynchopyle Grabowskii* Engler, if not exactly that. A specimen of the latter species is in the British Museum Herbarium, and appears very different. It has the thick short spathe of *S. Rhynchopyle*, and leaves of the same texture as that of the common *Rhynchopyle elongata* Engler, whereas the Perak plant has the long narrow spathe of the typical *Schismatoglottis*. Engler himself, followed by Sir Joseph Hooker in the *Flora of British India*, makes *Rhynchopyle* a section only of *Schismatoglottis*; but I think that, though *S. longifolia* has a short cup-shaped tube to the spathe in fruit, in all other respects it seems to be a true though peculiar *Schismatoglottis*. The long leaves, and tall slender peduncles produced in some numbers, make it a remarkable and conspicuous plant.

S. longicaulis, sp. n. Caulis elongatus, 7 pollices longus, $\frac{1}{8}$ pollicis crassus. Folia remota, petiolis gracilibus, 6 pollices longis, basi pollice late vaginantibus, laminis ellipticis lanceolatis acuminatis, basi cordatis, lobis rotundatis, 4 pollices longis, 2–3 pollices latis, nervis primariis 26. Scapi 2, pedunculis gracilibus, $1\frac{1}{2}$–2 pollices longis. Spatha ultra pollicem longa, cuspidata. Spadix cylindrica, appendice brevi cylindrica obtusa, parte mascula ter longiore, parte feminea $\frac{1}{2}$ pollicari. Spatha fructificans $\frac{1}{2}$ pollicis longa, $\frac{1}{4}$ pollicis lata.

Sumatra (*Forbes*, 1491). Herb. Mus. Brit.

This remarkable plant possesses an unusually long stem, apparently ascending, and furnished with long slender woolly roots. The leaves are about an inch apart, with very long slender petioles with a broad sheath at the base only a sixth of the petiole length. The spathe is rather small, narrowed in above the female portion; and the cylindric rather slender spadix has a very short apex of barren flowers.

Raphidophora lætevirens, sp. n. Caulis longe repens. Folia oblonga lanceolata herbacea læte viridia acuminata, basibus latis rotundatis, nervis subtus conspicuis copiosis, 24 pollices longa,

8 pollices lata, vel minora, petiolis 8 pollices longis ad genum alatis. Spatha cylindrica, 6–8 pollices longa, crassa, pedunculo valido, 3 pollices longa. Spadix longa cylindrica, 7 pollices longa, $\frac{3}{16}$ pollicis in diametro. Pistilla hexagona, stigmatibus discoideis.

On rocks, Selangor, Kwala Lumpur Caves, Penang, Penara Bukit.

This plant creeps often in large masses on the rocks in many places, but can seldom be met with in flower. Its long thin-textured leaves are of a very bright green, very unlike those of any other species known to me. The long cylindrical spadix is also remarkable.

Lemnaceæ of the Malay Peninsula.

No *Lemnaceæ* are definitely recorded from the Malay Peninsula in the *Flora of British India*, so that it may be worth while to record what species are as yet known from this region.

Lemna paucicostata Hegelm. is by far the commonest species. I have once met with it in flower in a partly dried-up pond. It is common in Singapore, Malacca, Pahang at Pekan, Province Wellesley at Permatang Bertam (no. 7011).

L. tenera Kurz was first collected in Pegu. I have met with it in Singapore, and the Dindings at Bruas, in ditches. It is not mentioned in the *Flora of British India*, as the flora of Pegu was not included in that work; and it has not apparently been gathered elsewhere, except by myself. It has never yet been met with in flower.

L. polyrrhiza L. is rare. I have met with it in ditches in Singapore.

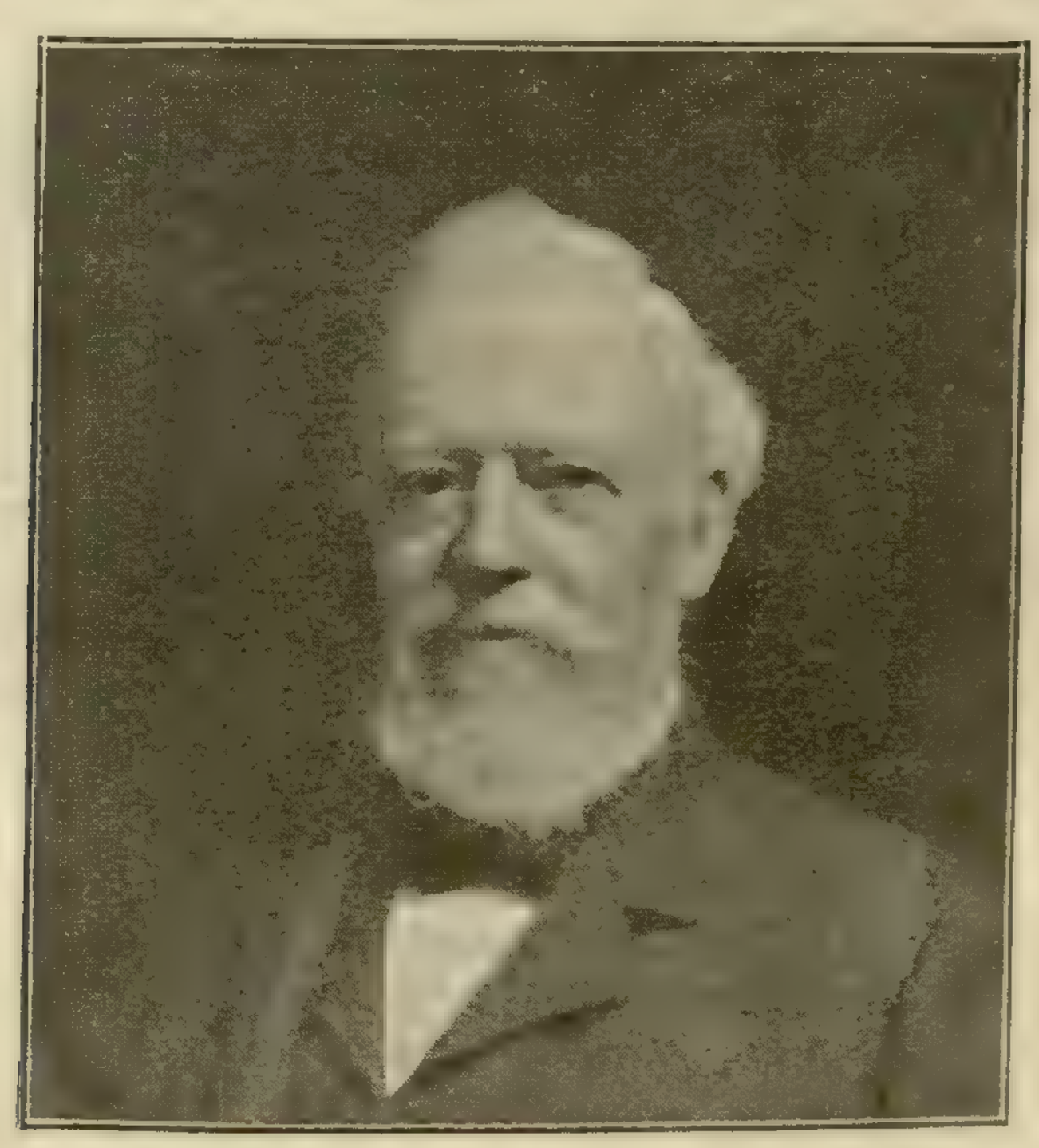
Wolffia arrhiza Wimm. is not, I believe, rare. I have collected it in Singapore, not far from the Gardens, and found it on one occasion in great abundance in an old well in the resident's garden in Malacca. It has, however, completely disappeared from there since.

THOMAS MEEHAN

(1826–1901).

The records of the work of Thomas Meehan, who died at Philadelphia on the 19th of last October, belong rather to American than to English annals; yet the foundation of his career was laid in the old country, and promise of his future achievements preceded his departure from our shores. Of Irish descent on his father's side, Thomas was born on March 26, 1826, at Potter's Bar, near Barnet, where the elder Meehan was a nurseryman. At an early age he began those investigations into hybridization and kindred matters in which he afterwards attained distinction. When only fifteen, he raised the first hybrid fuchsia, thus attracting the favourable notice of Lindley. Even earlier than this, however, his powers of observation had been exercised, for in his first published note, dated April 25, 1845 (*Phytologist*, ii. 171) he speaks of the stem of a

Rubus as being "to my knowledge, seven years old." Meehan was one of the early students in this country of this perplexing genus; he tells us in the interesting reminiscences which he contributed to the *Journal of the Kew Guild* for 1894 (pp. 38–43) that, "as a reward for the paper on *Rubus*, [he] was elected, before [he] was nineteen years old, a member of the Royal Wernerian Society." This paper does not seem to have been published, but he continued to study the genus after his arrival at Kew (in 1846), and at the end of 1847 wrote "A List of Rubi observed near London, with Observations" (Phyt. iii. 9). The observations read curiously



half-a-century and more afterwards, and may be worth reproducing: we certainly nowadays have no cause to complain of any "indisposition to study this genus":—

"It is to be regretted that so much indisposition to study this genus of British plants should exist. Perhaps few tribes afford such abundant opportunities of examining the vexed question of the nature of species as this, and yet this very fact is made an objection to their study! 'They are so changeable' is a common expression; 'my opinion is that there is not a dozen good species' is generally the encouraging stimulus the student of Rubi receives. But the question still remains, what is a species? and what is a variety? I do not clearly understand what Mr. Babington's ideas of species and varieties are, as exemplified in his *Synopsis*. I believe that the varieties of the *Synopsis* are principally dependent on their aptability to *approach* some other (normal) form when growing in the same soil and situation with it. I believe this was the reason for deciding *R. vestitus* of the 'Rubi Germanici,' and *R. villicaulis* of Babington's *Manual*, as mere varieties of *R. leucostachys* (Sm.). I find this 'var.' *argenteus* growing in a wet ditch by the side of the Thames at Mortlake, and exactly agreeing with a specimen gathered in a dry wood near Ryde. If *argenteus* is *R. leucostachys*, and merely

varying through difference in its place of growth, whence the circumstance I have related? or will different situations produce the same result? We gardeners, who are in the habit of raising seedlings of florists' flowers, generally understand a variety to be a form produced from seed, and capable of reproducing seed, differing in some respects from its parent, in contradistinction to a mule or hybrid, which is not capable of reproducing seed. If this be the true definition of a variety, can these so-called varieties of Rubi be considered as truly such? The various varieties of the apple, the gooseberry, and other fruit-trees still retain their several characteristics, although grown in the same soil and situations together, and why should not *true* varieties of Rubi?"

In the reminiscences already referred to, Meehan gives a graphic and interesting account of his two years at Kew, where he fully availed himself of the opportunities at his disposal and laid the foundation of his subsequent career. He did not get on well with Sir William Hooker, although on mature reflection he considered that the Director was mostly in the right. On one occasion he was sent, as a punishment, to walk in the Cactus House, which no one cared for; and here he acquired a knowledge of Cacti which he afterwards turned to good account. He says:—"When I flowered for the first time under cultivation in America *Cereus tuberosus*, it led to my acquaintance with my life-long friend, Dr. George Engelmann; and I have long since forgiven Sir William for the lucky 'punishment' he sentenced me to that day. There is a beautiful pass in the Rocky Mountains named Engelmann Cañon. Many have wondered what connection he had with it. I was the first white man who ever saw and explored it. As its discoverer I was asked by the surveyors to name it, which I did in compliment to my Cactus friend. Strange that my banishment to a hated greenhouse should have resulted in giving a great name for ever to a mountain pass!" Among his contemporaries at Kew was Seemann, to whom he refers as "my ideal."

After occupying two other situations in England, Meehan determined in 1848 to go to America on the invitation of Robert Buist, a florist in Philadelphia, with whom he remained for a year. In 1853 he established the nursery at Germantown, which he continued to supervise until his death, and which presented many of the aspects of a botanic garden. He speedily rose to an important position, both in scientific, educational, and political matters; and was a member of numerous learned societies. Of the variety and extent of his published contributions it would be impossible in our limited space to give any adequate notice: 121 papers, mostly botanical, stand under his name up to the end of 1883 in the Royal Society's *Catalogue of Scientific Papers*; these deal with such subjects as variation, fertilization, hybridity, structure, and evolution, and from first to last show the careful observation and attention to detail which marked his earlier contributions while yet a young gardener at Kew; he also corresponded with Charles Darwin, who frequently acknowledges help received from Meehan's observations. Systematic botany did not greatly attract him, although his paper

on the plants of Lewis and Clark's expedition across the American continent in 1804–6 shows that he knew something of herbarium work; and he contributed the letterpress to four volumes of illustrations of *The Native Flowers and Ferns of the United States*, published at Boston in 1878–80. In 1890, having previously, almost ever since he settled in America, acted as horticultural editor and adviser to various journals, he established *Meehan's Monthly*, a magazine of horticulture, botany, and kindred subjects. In May last he was awarded by the Royal Horticultural Society one of the "Victoria Medals of Honour in Horticulture."

We are indebted to the Proprietors of the *Gardeners' Chronicle* for the use of the accompanying block, which is from a portrait taken in Meehan's seventy-fourth year and presented to the American Academy of Natural Sciences.

SHORT NOTES.

A Statice Hybrid.—In the creek of Chichester Harbour which reaches to Bosham, an extraordinary quantity of *Statice rariflora* Drej. was noticed by my host the Rev. E. S. Marshall and myself in August of this year along the shores. *S. Limonium* L. was also abundant; and at two points about half a mile apart I noticed several intermediate plants, with panicles too lax for the one species and too close-flowered for the other; these were not all identical with one another, and seemed to present rather the variations one would expect from a hybrid than the stability that should constitute a variety or species. On closer examination this view seemed to be confirmed; and Mr. Marshall fully agreed with me that the series of intermediate plants represented a somewhat variable hybrid, *S. Limonium* × *rariflora*.—Edward F. Linton.

New Hybrid Grass. — A large patch of grass in wet ground by the River Avon, above Christchurch, took my attention, July, 1900, bearing some resemblance to *Festuca pratensis* × *Lolium perenne*, which I had met with in a neighbouring meadow, but differing conspicuously in the broader bulging spikelets not closely appressed to the rachis. Assuming that the plant was a hybrid rather than a new species, I saw that *Lolium perenne* L. was the obvious constituent; and *Bromus commutatus* L., which was present in abundance, would account for the differences in this puzzling grass. Specimens supplied to the Botanical Exchange Club (see Report for 1900, pp. 651–652) were forwarded to Dr. Hackel by Mr. G. C. Druce, who gives the expert's opinion with the following characteristic remark:—"This determination" (*i. e.* the hybrid naming) "appeared to me erroneous; and Dr. Hackel reports that the specimens are *Lolium perenne* L. var. *sphærostachyum* Masters in Journ. Bot. 1863, p. 8.—G. C. Druce." To this identification I see no objection. It is quite possible that Dr. Masters's variety was this hybrid. The description (*l. c.*) agrees well. I have seen no specimen; though Dr. Masters has searched for one for me, and given

me all he could in the way of information. Do any authentic specimens survive anywhere? I am confirmed in my op nion that the Avon Valley grass is a hybrid, since a strong patch in my garden with sixty to eighty spikes this summer proved perfectly sterile.—Edward F. Linton.

Acrobolbus Wilsoni (Tayl.) Nees in Scotland. — During the first week of November I found this very rare hepatic, with young fruit, in the ravine of Resipol Burn, Sunart, West Inverness. It was creeping among *Hymenophyllum unilaterale*, *Eurhynchium myosuroides*, *Lejeunea serpyllifolia*, and *Metzgeria conjugata*, on the stem of a tree. Mr. W. H. Pearson, to whom I sent a specimen, mentions that is the finest which he has seen of this species. It is doubtfully recorded by Mr. Stabler in his *Hepaticæ and Musci of Westmoreland*; otherwise it has only been previously found in Europe in the south-west of Ireland, where it does not appear to have been met with for many years.—Symers M. Macvicar.

Lejeunea Rossettiana Massal. in Scotland. — I found this interesting addition to the hepatic flora of Scotland last June in Pease Dene, Berwickshire. Mr. Pearson has confirmed the identification. I did not notice any limestone in the vicinity, the formation of which is sandstone.—Symers M. Macvicar.

Solanum rostratum Dunal in Britain.— It may be worth while to put on record the appearance of this prickly North American species in three widely separated localities in Britain, whence it has been received at the Royal Botanic Garden, Edinburgh, for identification during 1901. A specimen of the plant was first sent by Miss D'Ombrain from a field at Westwell, near Ashford, Kent; later it was received from Miss M. McKean, who reported that it had been found in a meadow at Ipswich; and lastly it has come through Mr. Wm. Barclay, of Perth, the specimen having been gathered by Mr. Gray in Perth Harbour last September. Mr. Barclay writes that the plant having since died without setting seed, it is not likely to reappear. The Kentish plant has, however, produced good seed, some of which I understand has been sown in a "secret place." I am not aware that more than a single plant was observed at each of the stations. It would be interesting to know by what means this native of the plains of Nebraska to Texas has been introduced. J. F. Jeffrey.

Potentilla supina L. in East Kent.—During a day's botanizing at Sandwich last August with three local botanists, this plant was found on Stonar Beach in some quantity, and apparently well established. The species has a wide distribution in temperate and tropical regions of the Old World from Central to Southern Europe, throughout Asia and Africa. The presumption is that it has been introduced with ballast.—J. F. Jeffrey.

NOTICE OF BOOK.

Botany of the Færöes, based upon Danish Investigations Part I. 8vo, pp. 340, 10 plates, 50 figures in text, and map. Copenhagen. London : Wheldon.

This well-printed volume is prefaced by historical notes by Prof. Warming, and contains, besides the "Phanerogamæ and Pteridophytya," elaborated by C. H. Ostenfeld, contributions on the Bryophyta by C. Jensen, the Freshwater Algæ by E. Borgesen, Freshwater Diatoms by E. Ostrup, and Fungi by E. Rostrup, and Lichens by J. O. Deichmann Brandth. The second part will contain the Marine Algæ and Diatoms, Plankton, &c. The work is written in English, and is thus easily consultable by British botanists, to whom the botany of the islands, which should be included in the British Flora, will prove of especial interest. The present notice is limited to a consideration of Ostenfeld's portion of the work.

The arrangement of the Phanerogams begins with the *Boraginaceæ*, and ends with *Selaginella*. It is illustrated with drawings of *Plantago lanceolata* v. *depressa*, *Rhinanthus*, *Euphrasia*, *Vaccinium*, *Cerastium Edmonstoni*, *Honckenya*, *Polygala vulgaris* v. *Ballii*, and *Ranunculus Flammula* f. *speciosa*. For the literature relating to the Islands, Dr. Ostenfeld refers to Rostrup's *Færoernes Flora* of 1870, and remarks that since then his own three papers, and those by J. C. Melvill (published in this Journal for 1891, pp. 179–185), Kurtz, and Simmons are the only additions to it. He has had access to Copenhagen Museum Herbarium, which contains the greater part of Lyngbye's collection, and to other principal ones, and material obtained by various collectors; but has relied chiefly on his own, made with Mr. Hartz, and in 1895–97. He makes a few additions to the received flora, and certain corrections, not accepting several of Trevelyan's determinations, &c. The most interesting of these additions are *Taraxacum croceum* Dahlst (which is said to need further investigation), *Lobelia Dortmanna*, *Rhinanthus grænlandica* Chab. (under which he puts *Drummond-Hayi* B.White as a variety), several Euphrasias (which he collected largely), among them "*E. latifolia* Pursh"—I am doubtful whether either this or the Scottish plant so named is the true plant of Pursh, and in a letter lately received Mr. Ostenfeld agrees with me—*Sagina nivalis*, *Subularia aquatica*, *Epilobium lactiflorum* Haussk., *Alchemilla filicaulis* Buser, *A. Wichuræ* Buser, *Rosa mollis*, *Carex salina* Wahlenb. subsp. *Kattegatensis* Fr., *Heleocharis multicaulis*, *Catabrosa aquatica*, *Glyceria maritima* (Simmons's specimens so named were *G. distans*), *Juncus biglumis*, *J. obtusiflorus*, *Malaxis paludosa*, *Potamogeton alpinus* Balb. (Kurtz's plant was wrongly so named), *Equisetum pratense* Ehrh., and *Lycopodium annotinum* L. This list will show that the later researches are bringing the flora of the islands more and more into line with the Scottish flora.

The interesting notes on *Cerastium Edmonstonii* are too long to

extract; the author agrees with Murbeck in his third paper on critical plants. With his remarks on *Polygala vulgaris* L. v. *grandiflora* Bab. (here named *P. vulgaris* v. *Ballii* (Nym.)) I cannot agree. Mr. Ostenfeld has very kindly sent me a set of the specimens gathered on the Islands, and among them one of this, which I cannot accept as identical with Babington's plant, of which I possess a good set. Had the plant to be named offhand from the figure, I should have thought it nearer *oxyptera* than *eu-vulgaris*.

In this account of the flora, the Færoes are credited with the following species not found in our Isles:—*Carex cryptocarpa*, *Alchemilla færoensis*, *A. Wichuræ*, *Archangelica officinalis*, *Epilobium lactiflorum*, *Koenigia islandica*, *Papaver radicatum* ("*P. nudicaule* Auctt. non L."), *Ranunculus glacialis*, *Salix glauca?*, *Gentiana islandica?*, *Taraxacum croceum?*. It seems possible that a few of these will yet be found in the extreme north of Scotland or the Isles.

It is impossible in this short notice to follow Mr. Ostenfeld into his interesting reflexions on the geographical studies of the flora of the Isles. He says:—"In Great Britain the matter has not received much attention since the days of Forbes and Watson, so that at the present time we have no up-to-date investigations for this country." To a great extent this is true, but we may urge that we have been trying to get a solid basis for such work before elaborating theories. I am glad that the author discusses so fully the matter of bird migration; in my opinion too much has been attributed to this means of transport. He quotes Mr. R. Anderson as saying that during four or five years' investigation, the intestines of the birds that had been caught at the lighthouses in Denmark were found, on dissection, to be empty; *i.e.* the birds migrate on an empty stomach. This is of course merely a local observation; but it supports the view that the agency of birds as plant-distributors has been over-rated.

The map which accompanies the work, based on the Danish Government Survey, 1895–1899, seems the weakest part of the book; the beautiful map of Captain Born of 1808 far surpasses it, the only advantage in the new one being the contour lines.

ARTHUR BENNETT.

A note on Herr C. Jensen's account of the Bryophyta may be welcome to Moss-students. A total of 95 Hepatics and 243 Mosses is enumerated, and among these are described a new Moss and new varieties of seven Mosses and two Hepatics. The new Moss is *Pohlia færoënsis*, and this species and *Philonotis Ryani* Philib. (a rarity which has been found in Norway also) are figured in the plates. Plates are also devoted to *Radula commutata* and *Dicranum Anderssonii* Schimp., and the differences of *Dicranum Starkii* and *D. arcticum* are figured in the text. A new valuation of the *subsecundum* group of Sphagna is essayed. Revisions of the incorrect determinations published by previous writers on the bryology of the islands are supplied. The geographical distribution of the species in the several islands and in the Færoes, as compared with Iceland, Norway, and our own country, is worked out carefully, and merits

attention. Seventeen species, indigenous in Britain and the Færoes, are not found in Iceland and Norway. Ten species common to the Færoes, Iceland, and Norway are absent from Britain; and eighty-three which occur in Britain, Norway, and the Færoes have yet to be found in Iceland—and many of them will be when they are duly searched for.

A. Gepp.

*ARTICLES IN JOURNALS.**

Botanical Gazette (25 Nov.). — G. T. Moore, '*Eremosphæra viridis & Excentrosphæra*' (3 pl.). — T. C. Frye, 'Development of pollen in some *Asclepiadaceæ*' (1 pl.).—F. G. Smith, 'Distribution of red colour in vegetative parts.'—G. H. Skull, 'Plant abnormalities.' —E. B. Copeland, 'Evergreen needles.'—M. L. Fernald, 'The instability of the Rochester nomenclature.'

Botanical Magazine (Tokyo) .— (20 Oct.). J. Matsumara, *Geranium shikokianum & G. Lakusanense*, spp. nn. — T. Makino, 'Observations on the Flora of Japan.'

Botaniska Notiser (14 Dec.). — F. R. Kjellman, 'Om arten och omfattningen af det uppbyggande arbete, som under groningsåret utföres af svenska vårgroende, pollakantiska växter särskildt örter.' —E. Haglund, 'Några bidrag till den skandinaviska fjallflorans spridningsbiologi.'—H. Witte, 'Några notiser om den fauerogama vinterfloran i Västergötland.' — R. Sernander, '*Zostera marina*.'— S. Murbeck, '*Galeopsis Carthusianorum* Neum. (*G. pubescens* Fr.).'

Botanische Zeitung (1 Dec.). — E. Hannig, 'Untersuchungen über die Schiedewäude der Cruciferen früchte' (3 pl.).

Bull. de l'Herb. Boissier (1 Dec.). — H. Ross, 'Beiträge zur Flora von Sizilien' (cont.).—G. Hegi, 'Das Obere Toesstal' (cont.). —J. Briquet, 'Anatomie comparée de la feuille chez les *Pistacia*.'— A. de Coincy, *Echium petiolatum*. sp. n.

Bull. Soc. Bot. France (25 Nov.). — (xlvi; sess. extraord. à Hyères, 1899). C. Flahault & —. Hue, 'Lichens du massif des Maures.' — J. Daveau, '*Quercus occidentalis* Gay.' — Ch. Flahault, 'La naturalisation et les plantes naturalisées en France.' — Id., 'Comptes rendus des herborisations.' — C. Gerber, 'Les *Passerina* provencaux.'—E. Olivier, 'Note sur l'herbier de Gérard.'

Bullettino della Società Botanica Italiana ("Giugno"; received 12 Dec.). — G. Mottarcale, 'Un esemplare teratologico di *Papaver Rhœas*.' — L. Micheletti, 'Sulla tossicatà dei semi di *Lolium temulentum*.' — L. Piccoli, 'Sulla naturazione biennale del Cerro.' — L. Nicotra, 'Gli *Echinops* italiani.' — P. A. Saccardo & A. Bèguinot, 'Giacomo Petiver e l'invenzione delle 'Plantæ Exsiccatæ''— — F. De Franciscis, 'Sulla prosenza dell' *Ustilago violacea* nei fiori

* The dates assigned to the numbers are those which appear on their covers or title-pages, but it must not always be inferred that this is the actual date of publication.

di *Melandrium pratense*.'—("Ottobre"; received 12 Dec.). E. Baroni & H. Christ, 'Filices in Shen-si collectæ a J. Giraldi.' — Id., 'Filices Setciouenses a U. Scallan collectæ.'—E. Baroni, 'Giuseppe Giraldi' (4 June, 1848–5 May, 1901).

Bull. Torrey Bot. Club (25 Nov.). — E. A. Smith, 'Charles Mohr' (1824–1901: portr.).—P. A. Rydberg, '*Limnorchis & Piperia*.' —G. E. Osterhout, 'New Colorado Plants.'

Gardeners' Chronicle (30 Nov.).—*Aster subcæruleus*, sp. n.; *Hyssopus officinalis* var. *grandiflorus* Rendle.—(14 Dec.). *Stapelia atrosanguinea* N. E. Br., *Stanhopea Langlasseana* Cogn., spp. nn.

Journal de Botanique ("Octobre"; received 6 Dec.). — A. de Coincy, 'Revision du genre *Echium*' (concl.). — A. Lemaire, 'Sur le gaine de quelques Schizophycées' (concl.). — P. Guérin, 'Développement de la graine de quelques Sapindacées.'

Nuovo Giornale Bot. Ital. (Oct.; received 12 Dec.).—L. Vaccari, 'Flora cacuminale della Valle d'Aosta' (concl.). — T. De Stefani Perez, 'Entomocecidiologia della Flora Sicula' (concl.). — A. Trotter, 'Le ragioni biologische della Cecidogenesi.'—P. Baccarini, 'Sulla vegetatione della Sicilia orientale.' — G. Bargagli-Petrucci, 'Le specie di *Pisonia* della regione dei Monsoni.' — L. Pampaloni, *Nostoc punctiforme*.

Oesterr. Bot. Zeitschrift (Dec.).—R. Wagner, *Erythrina* (concl.). —E. Hackel, 'Neue Gräser' (*Cyphochlæna*, gen. nov.; Arundinelleæ). —A. von Hayek, 'Flora von Steiermark' (concl.: *Hieracium*).

BOOK-NOTES, NEWS, &c.

At the meeting of the Linnean Society on Nov. 21st, Dr. A. B. Rendle showed specimens of *Rubus australis*, the New Zealand "lawyer-vine," which had been sent by Mr. F. W. Burbidge from the Trinity College Botanic Gardens, Dublin. The specimens, which comprised three forms, furnished a striking example of variability within the range of a single species. One, the leafy form, bore leaves with three large leaflets somewhat prickly on the stalks and midrib, recalling our native blackberry. In an intermediate form the leaflets were much reduced in size, while the stalks were longer and much more prickly. In a third the flat leaf-surface had completely disappeared, the leaves now consisting of an elongated stalk bearing long naked midribs, beset, like the leaf-stalks and the stem, with strong, short, recurving prickles, by means of which the plant climbs over surrounding vegetation. Mr. Burbidge states that the three forms are from three distinct plants, reared from seeds sent from New Zealand; they are said to be permanent under cultivation. Unfortunately there is no record of the peculiarities of habitat of the different forms in their native home. The scandent type, with its complete reduction of leaf-surface, is obviously adapted for growth under much drier conditions than the leafy one. In the xerophyte the assimilating function is shared to

a great extent by the well-developed green cortex of the elongated stem, which in the second year becomes separated by the formation of a deep-seated cork layer, as was pointed out some years ago by Prof. F. W. Oliver. As with our own *Rubi*, there is in the case of *Rubus australis* also some difference of opinion as to the limitation of species. In his *New Zealand Flora* Sir J. Hooker suggests three varieties, to one of which (*cissoides*) all the three specimens now in question belong. Allan Cunningham, however, raised the varieties to specific rank, and Thomas Kirk, in his recent *Flora of New Zealand*, takes a similar view. It is interesting to note, however, that in the original specimen, now in the British Museum, which Forster collected and on which he founded his species in 1786, two at least of these presumed species are represented, and the same remark applies to a specimen collected by Banks and Solander at Totaranui in 1791, and also preserved in the National Herbarium.

At the same meeting the President, Prof. S. H. Vines, gave some account of his investigation of the proteolytic enzyme of *Nepenthes*. He began by pointing out that in the higher animals there are two distinct proteolytic enzymes: (1) pepsin, secreted by the stomach; (2) trypsin, secreted by the pancreas. The action of pepsin upon the more complex proteids (albumin, fibrin, &c.) is to convert them by hydrolysis into simpler proteids known as peptones; whereas the action of trypsin is not only to convert these proteids into peptones, but, further, to decompose the peptones into non-proteid nitrogenous substances, such as leucin, tyrosin, &c. Among these final products of tryptic digestion there is a substance termed tryptophan, which has the property of giving a pink or violet colour on the addition of chlorine-water. Hence this colour-reaction may be used as a means of determining the nature of the digestion to which any proteid may have been submitted. As the result of previous researches upon the nature of the digestion effected by the enzyme of *Nepenthes*, the President had come to the conclusion that it was not peptic, as had been supposed, but essentially tryptic. This conclusion has recently been called in question by Clautriau (Acad. Roy. de Belgique, 1900), who re-asserts the peptic character of the enzyme. By means of the tryptophan reaction, which is readily given by the products of a *Nepenthes* digestion, Dr. Vines has been able to establish the correctness of the view that the enzyme is tryptic. The tryptophan-reaction has also been found to be given by a number of extracts of plants which are known to contain a proteolytic enzyme; for instance, pineapple-juice, papaïn, figs, germinating bean-seeds, &c. It seems probable, therefore, that proteolytic digestion in plants is always tryptic,—that there is, in fact, no peptic enzyme in plants. But there is this peculiarity about the trypsin of plants, that it has to work in an acid medium. It was suggested that the proteolytic enzyme of *Nepenthes* should be termed *nepenthin*, as that of the papaw is termed *papaïn*, and that of the pineapple *bromelin*.

On the same occasion a paper was read on behalf of Mr. T. F. Cheeseman, F.L.S., on the Flora of Rarotonga. Mr. Cheeseman

spent three months in 1899 on Rarotonga, the chief member of the Cook group, situated between the Tongan and Society Islands. The paper is the first enumeration of the vegetation of Rarotonga, comprising a total of 334 vascular plants. The ferns are most numerously represented, with 67 species; 25 grasses; nearly as many Leguminosæ, followed in due succession by Euphorbiaceæ, Solanaceæ, Compositæ, Rubiaceæ, and Malvaceæ; the remaining orders have less than 10 representatives each. Eighteen species are regarded as endemic, and are described as new, amongst them being the striking *Fitchia speciosa* Cheesm.

At the meeting of the same Society on Dec. 5th, Dr. J. H. Salter read a paper on "Protoplasmic Connections in the Lichens." The investigations detailed were undertaken at the suggestion of Prof. Arthur Meyer, of Marburg, the Lichens chosen for special study being *Peltigera canina*, *Evernia Prunastri*, *Usnea barbata*, *Cladonia furcata*, *C. rangiferina*, and *C. squamosa*. One per cent. of osmic acid was used for fixing, dilute sulphuric acid for causing swelling, and chloral hydrate for clearing; "Bairisches Blau," which is identical with Hoffmann's blue in its action, was employed for staining. Observations were made by a Zeiss $\frac{1}{16}$ homogeneous oil-immersion objective, giving a magnification of 1600 diameters, and the drawings were made by the aid of the camera lucida. Sections through the body of the Lichen, showing the cortex, gonidial layer, hyphæ, and rhizoids, were displayed on the screen, and the various forms of connection of hyphæ *inter se*, or with the algal cells, were pointed out. The author stated, in conclusion, that the observations tended to show that a complete anatomical union exists between the several tissues of the Lichen thallus, due to the innumerable connections which may be traced between the ultimate histological units, the segments of the hyphæ. Many physiological problems are simplified, and a new conception is obtained, by our ability to recognize the essential unity of the living matter throughout the organism.

The index to Dr. A. Braun's monograph of the *Symplocaceæ*—the latest instalment of *Das Pflanzenreich*—is noteworthy on account of its completeness and of the facility it affords to herbarium workers. The "register" includes not only the page-reference for each name entered in the monograph, but also the number of the species, whether retained or reduced; the former are indicated by a prefixed asterisk—a method of distinction which has something to recommend it, seeing that italics, which we are accustomed to employ for synonyms, are used for retained species in some books. Besides this we have a full record of collectors' numbers, including many which are not cited in the body of the book: the collectors' names are arranged alphabetically under two divisions (Old and New World); we think a single list would have been more convenient for reference.

The latest issue (issued in December) of the *Annuario del R. Istituto Botanico di Roma* contains the "Bibliografia e Storia" of the *Flora Romana*.

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No. 470 FEBRUARY, 1902 Vol. XL

THE JOURNAL OF BOTANY

BRITISH AND FOREIGN

EDITED BY

JAMES BRITTEN, K.S.G., F.L.S.

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☞ *Plate 430 is unavoidably delayed, and will be issued in March number.*

THE

JOURNAL OF BOTANY

British and Foreign

EDITED BY

JAMES BRITTEN, K.S.G., F.L.S

THE JOURNAL OF BOTANY was established in 1863 by Dr. Seemann. In 1872 the editorship was assumed by the late Dr. Trimen, who, assisted during part of the time by Mr. J. G. Baker and Mr. Spencer Moore, carried it on until the end of 1879, when he left England for Ceylon. Since then it has been in the hands of the present Editor.

Without professing to occupy the vast field of general Botany, the Journal has from its inception filled a position which, even now, is covered by no other periodical. It affords a ready and prompt medium for the publication of new discoveries, and appears regularly and punctually on the 1st of each month. While more especially concerned with systematic botany, observations of every kind are welcomed. Especial prominence has from the first been given to British botany, and it may safely be said that nothing of primary importance bearing upon this subject has remained unnoticed.

Bibliographical matters have also received and continue to receive considerable attention, and the history of many obscure publications has been elucidated. Every number contains reviews of new and important books written by competent critics: in this as in every other respect a strictly independent attitude has been maintained. While in no way officially connected with the Department of Botany of the British Museum, the Journal has from the first been controlled by those whose acquaintance with the National Herbarium has enabled them to utilize its pages for recording facts of interest and importance regarding the priceless botanical collections which the Museum contains. Many important monographs and other works first appeared in its pages. In 1896 it became necessary to increase its size, owing to the number of papers sent for publication: the number of plates was at the same time augmented.

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The bound volumes for 1896, 1897, 1898, 1899, 1900, and 1901 can be had at the usual price, £1 1s. each; also covers for the 1901 volume (price 1s. 4d. post free).

TETRAPLODON WORMSKIOLDII Lindb. IN BRITAIN.

By D. A. Jones, F.L.S., and E. C. Horrell, F.L.S.

(Plate 430, figs. 12–19.)

During a visit to Upper Teesdale of nearly a month's duration in August of last year, we found, growing on the summit of Widdy Bank Fell, Durham, on the side of one of the numerous peaty ditch-like depressions locally known as brocks, with which the flatter portions of the Durham and North Yorkshire moors are intersected, a *Splachnum* which attracted our attention by its great size and compact habit of growth, as well as by the small size of the fruits. In these respects it differed greatly from the numerous specimens of *S. sphæricum* we had observed on all the moors visited by us in the neighbourhood. All these latter specimens agreed in forming small button-like tufts rarely more than an inch in height, whilst the other formed a large compact mass at least six inches in depth. Only one of these tufts was observed.

This plant remained undetermined until one of us (D. A. J.) examined it, whilst working out the Musci Veri we had collected, and came to the conclusion that it differed considerably from *S. sphæricum*. It was then sent to Professor Barker, who identified it with *S. Wormskioldii*, with which determination Messrs. Bagnall, Dixon, and Nicholson, to whom it was subsequently submitted, agreed.

The Teesdale plant is conspicuous for the large size of its leaves, these being considerably longer and wider than in a specimen collected in Lapland by Schimper, and distributed by him in his "Pugillus." *S. Wormskioldii* would, however, appear to be very variable in the size of all its parts, there being arctic specimens in the National Herbarium less than half an inch in height and with small leaves, and others rivalling the Teesdale one in height and robustness.

The following description is for the most part a translation of those given by Schimper in the *Bryologia Europæa* and in the *Synopsis Muscorum Europæorum* (ed. ii.), the italics drawing attention to the points of greatest importance in separating *S. Wormskioldii* from *S. sphæricum*, the species with which it is most nearly related in vegetative structure:—

Tetraplodon Wormskioldii Lindb. in Musci Scand. 19 (1879).
Syn. *Splachnum Wormskioldii* Hornem. in Flor. Danica, tab. 1659; Bryol. Eur. iii. tab. 291.
Aplodon Wormskioldii R. Br.
Eremodon Wormskioldii Brid.

Monoicous, perennial; tufts soft, becoming in course of time tall and denser, vinous-red in the middle, interwoven with reddish radicles. Stem *2–6 inches high*, very slender, several times dichotomously branched. Leaves very soft, *from a broad base oval or broadly ovate*, acuminate obtuse or shortly or longly apiculate;

Mo. Bot. Garden
1904.

nerve slender; cells very lax. Male flowers on slender branches, numerous, fuscous. Capsule borne on a slender and soft pallid diaphanous pedicel, *minute, subglobose or elliptical*, fuscescent, when dry and deoperculate strongly abbreviated, discoideo-turbinate; apophysis *oval, slightly larger than the capsule*, at first green, finally blackish-brown; stomata numerous, in part tinged with red. Peristome-teeth rather small, subequidistant, yellow. Columella not exserted from the empty capsule.

This delicate moss bears some resemblance to slender forms of *S. sphæricum*, but is readily distinguished by the smaller capsules and more compact tufts; the leaves also differ considerably in outline from those of *S. sphæricum*, being much wider at the base, and the apex is entire or at most faintly uneven, whilst that of *S. sphæricum* is generally distinctly serrulate; the nerve is usually longer and stronger in *S. sphæricum*. The perigonial bracts also show fairly constant points of difference, being entire and wider in *T. Wormskioldii*, and coarsely serrate and less obtuse in *S. sphæricum*.

The apophysis has almost the same form and colour as the capsule, and is less succulent than in the other species of the genus; it appears to attain to its complete development at about the same time as the capsule, resembling in this particular the genera *Dissodon* and *Tetraplodon*, with which it also agrees in the form of the peristome. All the other characters, however, such as the softness of all the parts of the plant, the loose tissue of the leaves, the form of the calyptra, and the elongation of the seta subsequent to the dispersal of the spores, are (in Schimper's opinion) in favour of including it in the genus *Splachnum*.

The peristome resembles in form that of *Tetraplodon mnioides*, except always that soon after the fall of the operculum the teeth become equally distant from each other. On account of this character, Bridel included this moss in *Eremodon*, and R. Brown formed it into a distinct genus (*Aplodon*). Schimper, in the *Bryologia Europæa*, considers it to be the type of a subgenus of *Splachnum*, intermediate between that genus and *Tetraplodon*. Mr. Salmon, however, draws our attention to the fact that the structure of the peristome-teeth is very different in our plant from that found in *S. sphæricum*, not only in general appearance, but in its intimate structure. Mr. Salmon writes: "If the peristome of *T. Wormskioldii* is compared with that of *S. sphæricum*, it will be noticed that the teeth of the former are much larger and more solid, have an entire outline, and, viewed from the inside, have a number of very delicate vertical and oblique lines dividing the tooth into irregularly shaped cells. In *S. sphæricum* the teeth are much smaller—only about one-third the size—and more delicate, and have a crenate outline from the projecting plates; viewed from the inside, they are entirely without the vertical or oblique lines." On account of these peristome characters, Mr. Salmon, following Lindberg and Limpricht, is of opinion that the species is better placed under *Tetraplodon*, of which genus Lindberg (Musci Scand. p. 19) makes it a section (*Haplodon*), and this view we have adopted.

The columella does not project beyond the orifice of the capsule,

as it does in the other species of the genus, but becomes contracted into the sporangium at the moment of separation of the lid.

The fruit ripens in summer, and the plant appears to be less confined to decaying animal matter than the others of the order. Up to the present *T. Wormskioldii* has been looked upon as a typical arctic or subarctic species, being common in all high northern latitudes. It is common throughout Arctic North America (Greenland, Melville Peninsula, Melville Island, Labrador, &c.), is fairly common in Norway, Finland, Lapland, and Spitzbergen, and is rarely found in Siberia.

In this connection Lindberg & Arnell, in *Musci Asiæ borealis*, wrote: "It was long before we succeeded in finding this beautiful arctic species; it occurs, however, rarely near the Jenisei at about 70° N. latitude, and is apparently more frequent further north. It is, however, quite at home in Spitzbergen and Greenland, where, according to Berggren, it grows very tall on the excrementa of maritime animals; in the northern part of the Scandinavian Peninsula it is widely scattered, reaching its southern limit in lat. 60° N. (Dovre)."

The most southerly locality, however, given in various books and on the tickets of specimens in the Natural History Museum—*viz.* Updal, Dovre, and Dovrefjeld—all appear to be north of 62° N. lat., so that Widdy Bank Fell in about lat. 40° 11′ is very considerably further south than the previously known limit. The plant was growing at an altitude of about 1600 ft.

We are greatly obliged to Mr. Salmon for very kindly drawing the accompanying plate.

Description of Plate 430.

Figs. 12–19.—*Tetraplodon Wormskioldii* Lindb. 12. Plant about nat. size. 13. Single stem showing autoicous inflorescence, about nat. size. 14, 15. Stem-leaves, × 17. 16. Marginal areolation of same, a little below apex, × 170. 17. Apex of same, × 60. 18. Ripe capsule, in dry condition, × 17. 19. Single tooth of peristome, × 170. (Figs. 12–17 drawn from Teesdale specimens; 18 & 19 from a continental specimen.)

OCTODICERAS JULIANUM Brid. IN BRITAIN.

By J. B. Duncan.

(Plate 430, figs. 1–11.)

A note by Mr. J. E. Bagnall on the discovery of this moss in Worcestershire appeared in the *Journal of Botany*, July, 1901, but as the plant is but little known to British bryologists, it would appear to be advisable to publish a description, with figures. I have therefore written the following notes on its discovery in this country, and am greatly indebted to Mr. Horrell for translating Limpricht's description, and to Mr. Salmon for drawing the figures.

The plant first came under my notice in May, 1901, growing

attached to submerged timbers of floating landing-stages in the River Severn, at Bewdley; all the plants found here were young, and, although they resembled species of *Fissidens*, I could not make them agree with that genus.

Mr. Bagnall, to whom I sent specimens, determined the plant, and his opinion has been confirmed by Mr. Dixon, and also by Dr. Braithwaite, who has long regarded this species as one very likely to occur in Britain.

The impression that the plant preferred a matrix of wood led me to look for it in similar situations, but an examination of floating stages and hulks in the river and in the canal basins at Stourport, 3½ miles below Bewdley, was without result. At a distance of about a mile below Stourport, I, however, succeeded in again finding the plant attached to submerged timber, and also to stones in the river-bed. Following up this clue, I have since examined the river-bed over a distance of about thirteen miles, with the result that I have found the plant in various stages of development at frequent intervals on stones, boulders, and rocks. In some places specimens were young, and scarcely one inch high, forming wide patches; while the most developed specimens found have been three inches in height.

The level of the river is from time to time very variable, but our plant seems always to choose situations where even at times when the river is low it will not be left high and dry. It would appear to favour spots in the river-bed where large stones and boulders, finely mud-coated, are just covered by water, and the current is not very strong, and where it is probably protected from attrition during floods by the boulders.

In general appearance the species very much resembles young plants of *Fontinalis*, along with which it is often found; when immersed the much branched floating stems spread out in a somewhat spherical tuft, which collapses on being taken from the water.

At one time foreign timber was imported and towed up the Severn in baulks, but whether *Octodiceras* has been introduced by this means it is impossible to say; it is, however, evident from its abundance that it has long been an inhabitant of the river.

It seems probable that careful search would reveal the presence of this moss in other streams in England.

The following description is based upon that of Limpricht's 'Laubmoose' in Rabenhorst's *Cryptogamen Flora von Deutschland*, &c., ed. ii. Bd. iv. Abth. i. 456 (1887):—

Gen. Octodiceras Brid. Spec. Musc. i. 162 (1806).

Floating flaccid water-plants. Stem *without* central strand of thin-walled tissue, much branched, and with deciduous branches. Leaves non-bordered, *the superior lamina two or three times longer* than the sheathing lamina. Flowers axillary, bud-like, unisexual; perichætial branches elongated. Sporogonium breaking away when ripe above the vaginula, with short fleshly seta. Calyptra conical, undivided, smaller than the operculum. Capsule very small, regular, *without* stomata; peristome (in *O. Julianum*) *rudimentary*.

O. JULIANUM Brid. Bryol. Univ. ii. 678 (1827).
Syn. *Skitophyllum fontanum* La Pyl.
Fontinalis Juliana Savi.
Fissidens debilis Schwaegr.
Conomitrium Julianum Mont.

Autoicous; all the flowers axillary, rooting at the base, frequently male and female buds in the same leaf-axil; male flowers small, 2- and 3-leaved, with 6 antheridia; antheridium ·14 mm.; female flowers larger, with scale-like bracts and two perichætial leaves, up to 5 archegonia, which are ·44 mm. long, paraphyses wanting. Plants floating in water, flaccid, dark green, with a feathery habit owing to the spreading leaves, generally 5, rarely as much as 10 cm. long; stem very slender, much branched, the branches readily falling away and rooting at the base. Leaves loosely arranged, the lower scale-like, the others very long (up to 3 and 4 mm.), elongate-linear, rather obtuse, margin entire, non-bordered; dorsal lamina not reaching the leaf-base; nerve ending some distance before the leaf-apex, showing in section 2(–4) large basal cells, and a few large inner cells. Leaf-cells 4–6-sided, thin-walled, 14–18 μ in diameter, smaller (8 μ) at the margin. Fruiting branches elongated, with small leaves. Seta ·75 mm. long, upright, yellow, strongly swollen above the vaginula (up to ·18 mm. thick); vaginula almost cylindrical, short. Capsule small, erect, regular, green, thin-walled; the spore-containing portion ·5 mm. long, cup-shaped, wide-mouthed. Calyptra stout, shorter than the lid, conical, irregularly lacerate at the margin. Operculum longer than the spore-containing portion of the capsule, generally ·8 mm. long, with a conical base and a straight beak, margin red, basal cells roundish-hexagonal; annulus persistent, formed of one row of small yellowish cells. Peristome teeth (16) deeply inserted, upright when wet, orange, about 50 μ wide, only projecting about 90 μ above the mouth of the capsule, broadly truncate, generally irregularly fenestrate, rarely shortly 2–3-cleft, outer wall coarsely papillose. Cells of the exothecium rectangular, with thickened longitudinal walls, around the mouth several rows of roundish-hexagonal, collenchymatous cells. Spores 18–21 μ, yellow-green, weakly granular; ripe in spring and summer.

Hab. On stones in and by the borders of streams. Throughout the whole of Europe; North Africa; North America.

BRITAIN.—River-beds, attached to stones, boulders, and rocks; sometimes to timber. River Severn, Worcestershire and Shropshire. Fruit rare, not found in Britain.

DESCRIPTION OF PLATE 430.

Figs. 1–11.—*Octodiceras julianum* Brid. 1. Plant about nat. size. 2. Stem-leaf, × 17. 3. Areolation of superior lamina of same, × 270. 4. Apex of stem-leaf, × 170. 5. Fertile branch arising from axil of stem-leaf, × 17. 6. Ripe capsule in dry condition, × 35. 7. Single tooth of peristome, × 170. 8. Calyptra, × 17. 9. Male inflorescence, × 35. 10. Perigonial leaf, × 35. 11. Antheridium, × 35. (Figs. 1–4 drawn from specimen from Bewdley (leg. J. B. D.); 5–11, from a continental specimen.)

SOME CLYDESDALE AND S.W. AYRSHIRE PLANTS.

By the Rev. W. Moyle Rogers, F.L.S.

Assisted by my son, the Rev. F. A. Rogers, I was able to do some interesting botanical work in the western lowlands of Scotland last summer. Our first fortnight, June 11 to 25, was spent at Kilmalcolm, a fewmiles from the coast between Greenock and Glasgow. There we were on high moorland, and in the cold weather that almost outlasted our stay we found the vegetation exceptionally late. This was especially unfavourable to our study of the Rubi of that district. We then had a week of much more genial weather at Ashton, on the south bank of the Clyde beyond Gourock. While lodging there we were able to drive through Wemyss Bay to Skilmorlie, on the north coast of Ayrshire, and also to cross by steamer to Rothesay, Bute, for a two hours' walk in that neighbourhood, and on two other afternoons to explore some of the country around Kirn, near Dunoon, in Argyleshire. From Ashton we returned southwards, and spent the last three days (July 2 to 5) of our Scottish visit at and near Colmonell, in the south-west corner of Ayr. The following notes refer exclusively to the more interesting of the living plants that we saw in the course of these four weeks.

To the list of *Rubi* seen in the other counties I have added a few from Wigton, specimens of which were collected and brought to me by my son on July 5 from the country to the immediate south of Stranraer. All the vice-counties visited, therefore, were—74 Wigton, 75 Ayr, 76 Renfrew, 98 Argyle, and 100 Clyde Isles.

I am much indebted to Mr. W. L. Walker, of Kilmalcolm, for taking me to the localities of several of the most interesting plants in his neighbourhood, and to Dr. Fullarton for a similar kindness in his part of Ayr. My best thanks are also due to Mr. F. Townsend for determining my *Euphrasiæ*, and to Mr. Arthur Bennett for revising my list of comital "records," which are "starred" in the following notes.

Ranunculus auricomus L. 76. Near Kilmalcolm; very local, *W. L. Walker*!—*Trollius europæus* L. 76. By River Gryfe, between Kilmalcolm and Bridge of Weir. 98. By Loch Loskin, *F. A. Rogers*!

Papaver dubium L. 75. Near Pinwherry Railway Station; Colmonell.

Nasturtium palustre DC. 98. Kirn, roadside ditches. Queried for 98 in Top. Bot.—*Draba muralis* L. *76. Kilmalcolm; in some quantity on both sides of the "Rhododendron Drive." Shown to me (far advanced in fruit, but still quite recognizable) by Mr. Walker. — *Hesperis matronalis* L. 76. Waste ground by quarry half a mile on the Port Glasgow road, in good quantity; Bridge of Weir, near railroad.—*Erysimum cheiranthoides* L. 76. Kilmalcolm; garden weed, one plant.—*Lepidium hirtum* Sm. Remarkably abundant. 75. Colmonell; Ballantrae; Glen App. 76. Kilmalcolm;

Bridge of Weir.—*Raphanus maritimus* Sm. 75. Coast near Ballantrae.

Reseda Luteola L. 75. Glen App, *F. A. R.*! Apparently uncommon in South-west Scotland.

Helianthemum Chamæcistus Mill. 75. Locally abundant. Colmonell; Ballantrae; Glen App. Apparently still unknown for 76 and 98.

Viola lutea Huds. 76. Kilmalcolm; quite common, and in great beauty and variety of colour; chiefly wholly purple or nearly so, rarely wholly yellow.

Polygala oxyptera Reichb. *75. Sea shore near Ballantrae. *76. Kilmalcolm, on rocky knolls, with the last. 98. Hillside near Kirn. — *P. serpyllacea* Weihe. 75. Common. *76. Kilmalcolm; Ashton. 98. Kirn.

Stellaria nemorum L. 76. Near the coast at Langbank and Ashton. — *Sagina apetala* L. The segregate. *75. Girvan. *76. Langbank. Near Railway Station in both localities. — *Lepigonum salinum* Kindb. 76. Langbank. 98. Sandbank.

Malva sylvestris L. and *M. rotundifolia* L. Apparently rare. Seen only by the sea near Ballantrae (75).

Geranium phæum L. 75. Colmonell; "garden escape" near village.—*G. sylvaticum* L. 76. Between Kilmalcolm and Bridge of Weir, *F. A. R.*! — *G. pratense* L. 75. Colmonell; Ballantrae.—*G. columbinum* L. 75. Seen only near Ballantrae, where it was shown to me by Dr. Fullarton as one of the rarer plants of the district.

Trifolium medium L. 75. Near Colmonell, in plenty.—*T. striatum* L. 75. Near Ballantrae, *Fullarton*!— *T. hybridum* L. Apparently not yet very generally distributed. 75. Near Pinwherry. 76. Bridge of Weir.—*Anthyllis Vulneraria* L. Remarkably common in South-west Ayrshire (75): Girvan to Pinwherry, and Pinwherry to Ballantrae. — *Lathyrus montanus* Bernh. 75. Colmonell. 76. Common at Kilmalcolm.

Rubus idæus L. Common. — *R. plicatus* Wh. & N. Locally common. 74. Near Stranraer, to the south.† 75. Pinwherry; Colmonell; Glen App. 76, Kilmalcolm; with showy double flowers on several bushes on hill between Kilmalcolm and Langbank. 98. Sandbank to Glen Masson. — *R. Rogersii* Linton. Widely (though somewhat thinly) distributed, and quite characteristic. *75. Colmonell. *76. Kilmalcolm; Langbank. *98. Locally abundant from Kirn to Loch Loskin, Sandbank, and Glen Masson.—*R. Rogersii* × *R. Selmeri*. Near Glen Masson, *F. A. R.*! —*R. Lindleianus* Lees. Frequent in 75, 76, and 98. 100. Hillside north of Rothesay; the only locality visited in Bute and in v.-c. 100. —*R. rhamnifolius* Wh. & N. Rather thinly distributed. 74. Confirms previous uncertain record. *75. Colmonell, observed only in

† Except in the case of *R. rusticanus*, all the Wigton brambles mentioned were seen in this limited district south of Stranraer. So for them the comital no. 74 will alone be given, without repetition of the one locality.

one spot; Glen App. 98. Near Kirn. 100. Bute.—Subsp. *Bakeri* (F. A. Lees). 98. Hedge at Sandbank.—*R. Scheutzii* Lindeb. Well distributed, though not seen anywhere in great quantity. 74. *75. Ballantrae. *76. Langbank. 98. Sandbank to Glen Masson, *F. A. R.*! — *R. pulcherrimus* Neum. Very common. *75, *76.— *R. Lindebergii* P. J. Muell. *75. Colmonell, damp hillside.— *R. villicaulis* Koehl., subsp. *Selmeri* (Lindeb.). Not seen near Stranraer (74); but very common elsewhere. *75, *76. — *R. rusticanus* Merc. Frequent on coast from Stranraer (*74) to Ballantrae (*75). Rare inland. Colmonell to Ballantrae (75), occasionally. Not seen at all in the other counties.—*R. macrophyllus* Wh. & N. Apparently rare. *76. Ashton; a large-flowered untypical form. — Subsp. *Schlechtendalii* Weihe. *74. — Var. *macrophylloides* Genev. *98. Glen Masson, *F. A. R.*!—*R. hirtifolius* Muell. & Wirtg. var. *danicus* Focke. 98. Glen Masson, *F. A. R.*!—*R. Sprengelii* Weihe. 74.— *R. pyramidalis* Kalt. *74. *75. Skelmorlie. *98. Kirn. *100. Bute. — *R. mucronatus* Blox. 98. Sandbank to Glen Masson, *F. A. R.*! — *R. melanoxylon* Muell. & Wirtg. An exceedingly handsome bush; frequent and very luxuriant. *75. Skelmorlie. *76. Kilmalcolm; Langbank; Ashton. 98. Sandbank to Glen Masson.—*R. anglosaxonicus* Gelert, subsp. *raduloides* Rogers. *74. Stranraer is the only Scottish locality from which I have seen this bramble. — *R. infestus* Weihe. *75. Colmonell. *76. Ashton. 98. Kirn. *100. Bute. — *R. radula* Weihe. 75. Ballantrae.— Subsp. *sertiflorus* (P. J. Muell.)? *76. A plant which I cannot separate from the West of England form which we are thus naming (though it seems hardly identical with it) is fairly frequent at Kilmalcolm and Ashton; as in some parts of Perth and Dumbarton, where I first saw it in 1896. — *R. rosaceus* Wh. & N. var. *hystrix* Wh. & N. *74. This locality (Stranraer) is the only one in Scotland for which I am able to vouch. In the *Flora of Perth*, however, *R. hystrix* is also reported for two divisions of that county. — *R. Koehleri* Wh. & N. subsp. *dasyphyllus* Rogers (var. *pallidus* Bab.). *75. At least frequent and locally abundant. Skelmorlie; Colmonell; Ballantrae; Glen App. *76. On hill above Ashton. 98. Kirn to Glen Masson. 100. Bute. With the exception of *R. hystrix* in its one Wigton locality, *R. dasyphyllus* is the only form we saw belonging to our four glandular groups that come between the true *Radulæ* and the *Cæsii*. This remarkable scarcity of the most glaudular brambles in the Lowlands agrees with my experience in Mid-Scotland in 1896, as recorded in Journ. Bot. 1897, pp. 42, 49. So far, indeed, I have seen no Scottish specimens whatever belonging to the three groups *Sub-Koehleriani*, *Sub-Bellardiani*, and *Bellardiani;* and among *Koehleriani* only two rosacean forms in addition to the locally abundant *R. dasyphyllus*. This year I even looked in vain for *R. dumetorum* forms. — *R. corylifolius* Sm. *75 & *76. Locally abundant, and as variable as usual; characteristic *sublustris* at Colmonell (75); and much that I should put to var. *cyclophyllus* Lindeb. throughout that part of Ayrshire, and also by the coast at Ashton (76).— *R. cæsius* L.

*75. Rather common from Pinwherry to Ballantrae. *76. Ashton; in two or three spots.

Potentilla procumbens Sibth. 75. Near Colmonell. Glen App, *F. A. R.*! I looked in vain for *R. reptans* L., which has been reported for 75, 76, and 98, though not apparently for 100. It must, I think, be at least rare or decidedly uncommon in South-west Scotland, as well as quite absent from some of the northern counties. — *P. palustre* Scop. Very abundant around Kilmalcolm (76) and near Kirn (98). — *Alchemilla vulgaris* L. 75. Colmonell (type). 76. Common; type and var. *filicaulis* (Buser).

Rosa pimpinelloides L. 75. Colmonell; Ballantrae; Glen App. —*R. mollis* Sm. Apparently rare south of the Clyde. *76. Bridge of Weir; a few bushes, already showing characteristic fruit. Kilmalcolm; seen certainly in a spot or two. 98. Glen Masson, *F. A. R.*! Confirms doubtful record in Top. Bot. — *R. tomentosa* Sm. Exceedingly common and variable everywhere. Near Bridge of Weir (76) a very tomentose form with pure white flowers is frequent, and another form differing from var. *scabriuscula* Sm. only in its somewhat more glandular leaves. — *R. canina* L. Common; the most frequent varieties being, as is usual in South England, *lutetiana*, *dumalis*, and *urbica*. The form *verticillacantha* also occurs at Ashton. — *R. glauca* Vill. Bushes looking like this rose and its var. *subcristata* occur on the hillside at Colmonell (75) and in the Kilmalcolm neighbourhood (76); and others like var. *Watsoni* at Kilmalcolm and Langbank (76); but they were all too immature for positive determination.—*R. arvensis* Huds. My son showed me thickets of this extending for twenty or thirty yards on a marshy hillside at Colmonell (75); and I found an equally dense though rather smaller thicket of it by the Clyde between Ashton and Inverkip (76). The bushes were vigorous enough and flowering freely in both places; but I suppose that they are hardly likely to be native. If they were introduced by man's agency, however, many years must have elapsed since the planting.

Chrysosplenium oppositifolium L. 76. Kilmalcolm; Ashton.— *C. alternifolium* L. 76. Kilmalcolm, local, *Walker*! — *Sedum Telephium* L. 75. Colmonell to Ballantrae.

Drosera rotundifolia L. 76. Kilmalcolm, *Walker*! 98. Skelmorlie.

Epilobium angustifolium L. 75. Ballantrae. *76. In several spots from Inverkip towards Ashton. Possibly introduced in both cases. — *E. obscurum* Schreb. Common. *75. Skelmorlie; Colmonell. *76. Kilmalcolm; Bridge of Weir; Langbank; Ashton. 98. Kirn. 100. Bute. I looked in vain for *E. hirsutum* L. and *E. parviflorum* Schreb., which must be local, if not rare, in 75 and 76.—*Circæa alpina* L. *76.. At base of hills by the Clyde at Langbank and Ashton. In both places a luxuriant form, perhaps best put to var. *intermedia* (Ehrh.), but keeping clearly distinct from *C. lutetiana* L.

Conium maculatum L. 75. So frequent from Colmonell to Ballantrae as to seem native. — *Carum verticillatum* Koch. 76.

Very frequent about Kilmalcolm and on hill above Ashton. 98. Near Kirn, in great quantity. — *Ægopodium Podagraria* L. One of the most abundant and generally distributed umbellifers seen in all four counties, and I think clearly indigenous, especially in wild moorland districts. — *Myrrhis odorata* Scop. Decidedly local. 75. Near Pinwherry. 76. Inverkip, abundant. 100. Bute.

Meum athamanticum Jacq. 76. Rocky ground about Kilmalcolm, in great profusion and beauty. — *Ligusticum scoticum* L. 75. Glen App, *F.A.R.*! In one spot pointed out by Dr. Fullarton.

Viburnum Opulus L. Seen only at Port Glasgow (76), where it may have been introduced.

Galium boreale L. 75. By River Stinchar, near Ballantrae, *Fullarton*! — *G. Mollugo* L. 76. Kilmalcolm, in the "Rhododendron Drive"; in no great quantity, but apparently spreading. Perhaps introduced with bushes, as it is not otherwise known for 76.

Eupatorium cannabinum L. Seen only at Skelmorlie (75).— *Pulicaria dysenterica* Gaertn. 75. Colmonell, in hollow a quarter of a mile to east of village; in fair quantity.—*Tanacetum vulgare* L. 76. In a few spots between Ashton and Inverkip. Not observed elsewhere.—*Carduus pycnocephalus* L. 75. By the coast at Ballantrae. — *Hieracium vulgatum* Fr. 76. Abundant about Kilmalcolm and Bridge of Weir. — *H. boreale* Fr. and **H. umbellatum* L. 75. By River Stinchar, near Ballantrae, *Fullarton*! — *Crepis paludosa* Moench. 75, 76. Frequent. Just bursting into flower at the end of June.

Jasione montana L. 75. Rather frequent from Pinwherry to Ballantrae.—*Campanula latifolia* L. 75. Near Ballantrae.

Pyrola minor L. 76. Kilmalcolm; in good quantity in one small wood, where it has been seen for some years by Mr. Walker.

Linaria viscida Moench. 75. Railroad near Pinwherry Station, in great quantity.

Euphrasia brevipila Burn. & Grem. *75. Colmonell, dry grassy slopes on both sides of the valley, abundant. When naming these specimens, Mr. Townsend adds the note, "Young but fairly typical form in Scotland." *76. Ashton, damp hillside. "Very young and in favourable soil and situation," F. T. Some of the specimens from this locality are distinguished by Mr. Townsend as "forma *glandulosa*." 98. Near Kirn and Sandbank. "A poor soil form," F. T. 100. Damp hilly pastures near Rothesay. The foregoing only among my specimens were sufficiently mature for positive determination; but some others collected by me at Sandbank (98), and by my son at Glen App (75), Mr. Townsend thinks may be *E. curta glabrescens* Wettst.

Pinguicula vulgaris L. Locally abundant. 75. Colmonell. 76. Ashton; Kilmalcolm.

Calamintha Clinopodium L. 75. Near Ballantrae, local, *Fullarton*! The query against 75 in Top. Bot. may certainly be removed. Though clearly native, I think, in the lane where Dr. Fullarton showed it to me, it is probably, as he believes, very rare in the

county. — *Salvia Verbenaca* L. *75. By the sea near Ballantrae. Dr. Fullarton has also seen it on banks by Ardstinchar Castle.— *Scutellaria galericulata* L. 75. Glen App, *F. A. R.* !—*Melampyrum pratense* L. 76. Near Kilmalcolm. 98. Sandbank.

Plantago maritima L. Abundant everywhere on the coast.— *P. Coronopus* L. 75. Ballantrae, by the sea.—*Atriplex laciniata* L. 75. Ballantrae. 76. Ashton.

Betula verrucosa Ehrh. *75. Colmonell. 76. Bridge of Weir. —*B. pubescens* Ehrh. 98. Sandbank.

Habenaria conopsea Benth. 76. Frequent at Kilmalcolm and Ashton. 98. Glen Masson, *F. A. R.* !—*H. albida* R. Br. 76. Kilmalcolm, a few plants; apparently local. — *H. bifolia* R. Br. 76. Kilmalcolm. 98. Near Kirn. 100. Bute.— *H. chloroleuca* Ridley. 75. Colmonell. 76. Kilmalcolm, frequent; Ashton. 100. Bute.

Allium vineale L. 75. By River Stinchar, near Ballantrae.— *A. ursinum* L. 76. In great quantity from Ashton to Inverkip.

Luzula albida DC. var. *rubella* Hoppe. 76. "Rhododendron Drive," Kilmalcolm. No doubt introduced, but now very abundant.

Carex pulicaris L. 75. Colmonell. — *C. remota* L. 76. Langbank.—*C. curta* Good. 76. Common at Kilmalcolm.—*C. limosa* L. 76. Kilmalcolm, Moss near the Park, *Walker* ! — *C. pilulifera* L. 76. Near Kilmalcolm.—*C. verna* Chaix. 75. Ballantrae.—*C. pallescens* L. 76. Kilmalcolm, locally in fair quantity. 98. Kirn to Glen Masson. — *C. pendula* Huds. 76. Ashton to Inverkip, rather frequent, especially towards Inverkip. — *C. fulva* Good. 76. Kilmalcolm. — *C. rostrata* Stokes, var. *involuta* (Bab.). 98. By Loch Loskin, *F. A. R.* ! Rev. E. F. Linton assents to the name. Off *C. rostrata* towards *S. vesicaria*.—*C. muricata* L., *C. echinata* Murr., *C. oralis* Good., *C. panicea* L., *C. binervis* Sm., *C. Œderi* Retz, and *C. hirta* L. all seemed frequent and locally abundant.

Avena pubescens Huds. 75. Ballantrae.—*Koehleria cristata* Pers. 75. Colmonell, very luxuriant; Ballantrae, in great quantity. — *Glyceria plicata* Fr. *76. Kilmalcolm, by streamlet on the Port Glasgow Road (with *G. fluitans*), in plenty. — Var. *pedicellata* (Towns.). 98. Near Kirn. — *G. maritima* Mert. & Koch. 76. Langbank.—*Festuca rottboellioides* Kunth. 74, 75. Coast, Ballantrae. — *F. sciuroides* Roth. Apparently uncommon. 76. Kilmalcolm; Bridge of Weir. — *F. arundinacea* Schreb. *76. By the Clyde at Ashton and Langbank.

Polystichum angulare Presl. 75. Colmonell, by stream; quite typical. — *Lastræa Filix-mas* var. *paleacea* Moore. 76. Frequent; perhaps as much so as the type.

Equisetum sylvaticum L. 98. Loch Loskin, *F. A. R.*!

NOTES ON INDIGOFERA.

By David Prain, F.L.S., and Edmund Baker, F.L.S.

The following notes have been made during the course of an examination of some of the types of the older species of *Indigofera*. The primary object of this examination was the elucidation of the synonymy, &c., of the "Indigo-yielding species," but notes on some of the other species are also included.

I. Identification of Old Material.

Prior to the publication of Linnæus's *Species Plantarum* in 1753 we have figures of plants of this genus in various botanical works. It is, perhaps, only necessary to refer here to the figures of four of these early authors; references to others will be met with under the species they delineate.

Rheede, in his *Hortus Malabaricus*, 1678–1703, vol. i. tab. 54, figures a plant which Linnæus quotes in his synonymy of *I. tinctoria*, and which De Candolle, in the *Prodromus*, ii. p. 224, places under his var. *α macrocarpa*; it is the South Indian plant which is named *I. tinctoria* in the Linnean herbarium. Vol. ix. tab. 30, shows the plant we now know as *I. hirsuta* L. Rheede's tab. 67 in the same volume is stated in the *Flora Zeylanica* to be a bad figure of the plant that we now know as *I. glabra*; in our opinion it is not an *Indigofera*. Rheede's remaining plates will be found quoted under their respective species in Hooker's *Flora of British India*, vol. ii. pp. 92–102.

Plukenet, in his *Phytographia* (1691), figures several species. The types of these are preserved in the Sloanean Herbarium in the National Collection, and it may be well to give an enumeration of them, together with our identifications.

Tab. 101, fig. 6, Nil seu Anil sylvestre Cynanchicæ foliis Bisnagarica. Herb. Sloane, vol. 93, f. 224; see also vol. 242, f. 84. = *I. aspalathoides* L.

Tab. 165, fig. 5. Colutea siliquosa Maderaspatana ad nodos caulium siliquis bigemellis. Herb. Sloane, vol. 95, f. 186.

Burman (Fl. Indica, p. 170 (1768)) considers this var. *β* of *I. tinctoria*, but it is only one of the usual states of the South Indian form of this species.

Tab. 165, fig. 4. Colutea minima species disperma ex India Orientali (= *Hedysarum prostratum* fide Giseke Index Pluken. p. 8, 1779). Herb. Sloane, vol. 95, f. 186. = *I. enneaphylla* L.

Tab. 166, fig. 1. Coluta siliquosa glabra ternis quinisve foliis Maderaspatana semine rubello. Herb. Sloane, vol. 95, f. 186. = *I. glabra* L.

Tab. 166, fig. 2. Colutea enneaphylla Lotoides Ind. Orientalis siliculis conglomeratis (= *Psoralea pinnata* Giseke, *l. c.*, non L.). Herb. Sloane, vol. 95, f. 186. = *I. enneaphylla* L.

Tab. 166, fig. 3. Colutea siliquosa enneaphylla Ind. Orient. siliquis foliis aversa parte pubescentibus. Herb. Sloane, vol. 95, f. 185. = *I. viscosa* L.

Tab. 185, fig. 5. Genista capensis spinosa Ligustrifolio pentaphyllo floribus spicatis rubris. Herb. Sloane, vol. 96, f. 50. = *I. cytisoides* L. quoted for this plant in Willd. Sp. Pl. iii. p. 1232, 1800.

Tab. 320, fig. 3. Trifolium æthiopicum ex alis, &c. = *I. psoraloides* L. quoted for this plant in Willd. Sp. Pl. iii. p. 1223, 1800.

Sloane (Nat. Hist. Jamaica, tab. 179, fig. 2, & tab. 176, fig. 3) figures two plants, and specimens of both of these are preserved in his herbarium. The first is placed by De Candolle among the synonyms of *I. tinctoria* L. var. *macrocarpa* DC.; it is the form equivalent to *I. Sumatrana* Gaertn. (*I. indica* Lamk.). The second is practically the type of *I. Anil* L. var. *oligophylla* DC., which is the same as *I. truxillensis* H. B. K.

Rumphius (Herb. Amboinense, tab. 80) figures a plant which De Candolle doubtfully attributes to *I. tinctoria* L. var. *macrocarpa* DC., and also to *I. Anil* L. var. *orthocarpa* DC. We consider the figure to be that form of *I. Anil* variously distinguished as *I. Anil* L. var. *olygosperma* Miquel, and *I. Anil* L. var. *asperma* Zoll., the form assumed by *I. Anil* when grown as a perennial, and when propagated by cuttings and offsets instead of by sowing.

Linnæus in his *Flora Zeylanica* occasionally quotes Petiver, and it may be well to enumerate the species of *Indigofera* to be found in his works. Petiver was contemporary with Plukenet, and his herbarium is also preserved in the National Collection. The types of many of the plants mentioned in his "Catalogus Plantarum" at the end of Ray's *Historia Plantarum* are in this collection, as are also the types of plants in the "Musei Petiveriani Centuriæ," 1695–1703, and of plants mentioned in his papers to the *Philosophical Transactions* between the years 1697 and 1717. Among them are the following species of *Indigofera*, and, as Petiver died in 1718, they form interesting early records for this genus:—

"45. Colutea lanuginosa floribus parvis siliquis pilosis deorsum tendentibus an Kani tageri H. Mal. v. 9, tab. 30, p. 55? Scorpion Sena with pendulous hairy podds. It grows about Cape-Coast plentifully. I have also seen it from the East-Indies." Mus. Pet. Cent. i. p. 9, 1695. Herb. Sloane, vol. 161, f. 83, & vol. 289, f. 22. = *I. hirsuta* L. This synonym was quoted by Linnæus in Fl. Zeylanica under this species.

"357. Astragalus Madrasp. Tragacanthæ foliis." Mus. Pet. Cent. iv. & v. p. 37. Herb. Sloane, vol. 161, f. 76. Also among Plukenet's plants, Herb. Sloane, vol. 104, f. 33. = *I. Wightii* R. Graham.

"59. Colutea Madraspat. siliquosa, flo. nudo spicato." Cat. Pl. Ray Hist. Pl. iii. App. p. 243. Herb. Sloane, vol. 161, f. 82. = *I. pulchella* Roxb.

"80. Anil Madraspat. trifoliata." Cat. Pl. *l. c.* Herb. Sloane, vol. 161, p. 106. = *I. trifoliata* L.

"81. Anil Madraspat. Viciæ foliis incanis caulibus pubescentibus." Cat. Pl. *l. c.* Herb. Sloane, vol. 161, f. 71. = *I. glabra* L.

"10. Shearanar weamboo Malab. Anil Madraspatana foliis minimis confertis." Philosophical Transactions, No. 244, p. 318

(1698). Herb. Sloane, vol. 161, f. 51, & vol. 276, f. 7. = *I. aspalathoides* L.

"35. Caut Morunga Malab., or Wild Bezoar Tree. Anil Madraspatana trifoliata, siliquis carinatis hirtis." Phil. Trans. No. 244, p. 330 (1698). Herb. Sloane, vol. 161, f. 106, & vol. 274. f. 20. = *I. trita* L.

"57. The True Indigo." Phil. Trans. No. 266, p. 703 (1700). Herb. Sloane, vol. 332, p. 61.

I. tinctoria L., the true or Madras form of the species. Gathered by Samuel Brown, April, 1696, near Pearmeedoor, about sixteen or seventeen miles from Fort St. George; this is also the locality for the other plants mentioned here which were described by Petiver in Phil. Trans.

"70. Codeseru-paulado Malab. Anil Pearmeedoorica Coluteæ foliis pubescentibus fere pentaphyllis." Phil. Trans. 1700, p. 708. Herb. Sloane, vol. 276, f. 6. = *I. glabra* L.

"81. Chetamucan Malab. Anil Pearmeedooricum trifoliatum, glaucum, siliquis rigidis." Phil. Trans. 1700, f. 714.

I. trita L., but on the same sheet there is a specimen of *I. oblongifolia* Forsk. (*I. paucifolia* Del.). Herb. Sloane, vol. 161, f. 105.

In Herb. Sloane, vol. 274, f. 20, there is another label No. 81 with only a specimen of *I. oblongifolia* Forsk. This fact, coupled with the fact that Petiver has already disposed of *I. trita* under No. 35, leads us to suspect that No. 81 is intended to refer only to *I. oblongifolia*. Local botanists will, however, probably be able to settle the point with the assistance of Petiver's vernacular names.

Other early specimens of *Indigofera* preserved in the Sloane Herbarium are:—

Colutea Indica Galegæ folio & siliqua, floribus purpureis ex Insulâ Johannâ: Pluk. Mantissa, p. 52 (1700); Ray Hist. Suppl. p. 452 (1706); Herb. Sloane, vol. 102, f. 169. Supposed to have been collected by Dr. Adair on these islands, and sent to Dr. Plukenet. = *I. endecaphylla* Jacq.

"Colutea anilifera ex Coromandel." Herb. Sloane, vol. 102, f. 170. Amongst Plukenet's plants.

"Colutea anilifera Ind. Or. Erymurry." Herb. Sloane, vol. 93, f. 109. = *I. tinctoria* L., the true or Madras form of this species.

"Wild Indigo cald Guatimala Jam: H. B." Herb. Sloane, vol. 184, f. 8. = *I. Anil* L.

The species that follow are arranged according to the sequence of the dates of their publication. The three species of Indigo named by Linnæus in the first edition of his *Species Plantarum* are the same as in his earlier *Flora Zeylanica* (1748), which was founded on the collections of P. Hermann; specimens of all three exist in Hermann's herbarium.

In the *Species Plantarum*, 1753, we have, therefore:—*I. tinctoria* = the Madras form of this plant, but, as his herbarium shows, with the plant subsequently distinguished as *I. Anil* included; *I. hirsuta* and *I. glabra*. Additional in *Species Plantarum*, ed. 2, 1763, we have *I. racemosa* and *I. trifoliata*. Additional in *Syst. Nat.* iii. Appendix, p. 232, 1768, we have *I. disperma*.

Burmann, in his *Flora Indica*, 1768, p. 170 *et seq.*, has the following :—

I. tinctoria, the same as the Ceylonese and Indian portion of *I. tinctoria* L.

I. hirsuta, also that of Linnæus.

I. glabra, also that of Linnæus.

I. trifoliata, also that of Linnæus.

I. argentea, a good species, and altogether distinct from the species named *I. argentea* by Linnæus in 1771.

Miller, in his *Dictionary*, ed. viii. 1768, has the following :—

I. tinctoria ; this, as an authentic example from Herb. Miller shows, is not the Linnean *I. tinctoria ;* it is not, as a matter of fact, any form of *I. tinctoria*, but is the cultivated state of *I. Anil β polyphylla* DC., *i. e.* the true *I. Anil* of Linnæus.

I. suffruticosa ; this, as the authentic example shows, is the same as the "Guatimala Indigo" of Browne and Lunan, and therefore only the wild state of the foregoing.

I. caroliniana, in all likelihood the same as the plant later termed *I. caroliniana* by Walters, and therefore = *I. disperma* L. There is a specimen of *I. disperma* in Herb. Miller, but it is not named *I. caroliniana.*

I. indica = *I. hirsuta* L., and not the later *I. indica* of Lamarck.

I. glabra, the same as that of Linnæus.

In Linnæus, *Mantissa*, pp. 272–273, 1771, are the following ; some of them are only in a note :—

I. sericea (now referred to *Amphithalia*) ; *I. trifoliata*, as in Sp. Pl. ed. ii. ; *I. psoraloides ; I. procumbens ; I. cytisoides ; I. argentea*, a very different plant from the *I. argentea* of Burmann ; it was not named *I. argentea*, but *I. tomentosa*, by Linnæus in his own herbarium ; *I. hirsuta*, as in Sp. Pl. ed. i. ; *I. enneaphylla ; I. angustifolia ; I. Anil*, a species founded on a specimen included till this time by Linnæus under *I. tinctoria*, the specimen in question shows that Linnæus's *I. Anil* is exactly the plant previously characterized by Miller as *I. suffruticosa*, and subsequently named by De Candolle *I. Anil* var. *β polyphylla ; I. tinctoria*, now limited by Linnæus, as in his *Flora Zeylanica* of 1748 and as in Burmann's *Flora Indica* of 1768, to the Madras form of *I. tinctoria ; I. disperma*, as in Syst. Nat. iii. Append. ; *I. glabra*, as in Sp. Pl. ed. i.

II. Notes on Individual Species.

I. TINCTORIA L. Sp. Pl. p. 751 (1753). The original description is as follows :—

"Indigofera [tinctoria] leguminibus arcuatis incanis, racemis folio brevioribus. Fl. Zeyl. 273. Amoen. Acad. i. p. 408. Hort. Ups. 208. Mat. Med. 348.

"Indigofera foliis nudis. Hort. Cliff. 487.

"Anil f. nil inodorum color. Bauh. Hist. ii. p. 945.

"Ameri, Rheed. Mal. i. p. 101, t. 54.

"Habitat in India."

As we have previously stated, there is a specimen in Herb. Hermann which is the Madras form of *I. tinctoria* as we now understand that species.

Ameri Rheede Mal. *l. c.* is *I. tinctoria* α *macrocarpa* DC. There are two specimens of *I. tinctoria* in Linnæus's herbarium. There is a third sheet, at first named by him *I. tinctoria*, afterwards altered by himself to *I. Anil*. The two left as *I. tinctoria* are the Madras form of α *macrocarpa* DC. The third sheet is *I. Anil* L. β *polyphylla*.

I. TINCTORIA α MACROCARPA DC. Prod. ii. p. 224 (1825). "Leguminibus elongatis 8–10 spermis. Verosimil ex India orient orta. Sloane, Jam. 2, t. 179. f. 2. Rheed. Mal. *l. c.* t. 54. Rumph. Amb. 5. t. 80? *I. Sumatrana* Gaertn. Fruct. 2, p. 317, t. 148. Lam. Ill. t. 626, f. 1. An ab hac satis differt *I. cærulea* Roxb. Cat. Calc. 57 (v. s. specimen ex India et Senegal)."

Under the above name, as far as citations go, are thus included both the fairly distinctive cultivated forms of *I. tinctoria*, the southern or Madras form with pods longer and more slender, and also as a rule fewer in number than the northern or Bengal form.

So far as specimens go, however, an examination of the Prodromus Herbarium obligingly permitted by M. C. de Candolle, who, with M. A. de Candolle, has most kindly helped one of us in the examination, shows that α *macrocarpa* includes (1) a specimen of the cultivated form of *I. suffruticosa* (i. e. *I. Anil* β *polyphylla* DC.) marked "Coronilla? Senegal, Sparmann"; (2) a specimen of the wild form of *I. suffruticosa*, marked "Envoi de Demerara, M. Parker"; (3) a specimen of *I. cærulea* Roxb. *i. e.* of the eastern form of *I. articulata* Gouan; and (4) a specimen of *I. tinctoria* Herb. Vahl, from Guinea, collected by Thonning and presented by Sonder. This is the northern or Bengal form of *I. tinctoria*, and is the only specimen of *I. tinctoria* present in the Prodromus cover of *I. tinctoria* α *macrocarpa*.

It may be as well in this place to state what in our opinion the forms of *I. tinctoria* are. There are three of them:—

1. The wild form, apparently unknown to Linnæus or De Candolle. This is the plant first discovered by Kotschy, and characterized as *I. Anil* L. var. *orthocarpa* by Schimper in sched. in Kotschy, Iter Nubicum, nn. 268, 331 (1841). It is not De Candolle's *I. Anil* γ *orthocarpa* Prodr. ii. 225. Berg, who thought it to be De Candolle's variety of this name, recognized in it a distinct species, the synonymy of which is as follows:—

I. orthocarpa Berg in Berg & Schmidt, *Darstell. u. Beschr. officin. Gew.* iv. xxx. (1863); Baker in *Flora of Tropical Africa*, ii. p. 99 (1871), non Presl. *I. Bergii* Vatke in *Appendix ad Ind. Sem. Hort. Berol.* 1876, p. 3.

This form has frequently been collected in Africa; it is interesting to find that the African Continent, and not, as has usually been supposed, some portion of South-eastern Asia, is probably the original home of *I. tinctoria*. This form, though exceedingly rare in India, is not there wholly unknown; specimens agreeing with the African plant have been collected in Central India.

2. The Southern, or Madras and Ceylon cultivated form, which constitutes the plant dealt with by Linnæus in his *Flora Zeylanica*, by Burmann in his *Flora Indica*, and, with the exception of the

specimen of *I. Anil* originally referred by Linnæus to *I. tinctoria*, is the *I. tinctoria* of the *Species Plantarum*. It was apparently from early times cultivated in Southern India and throughout the Malayan region. Apparently it is now largely cultivated only in the Madras Presidency; it is there looked upon as something quite distinct from the Indigo-plant of Northern India, so much so, that it generally goes by the name of *I. Anil* among those who think themselves well-informed. It has, of course, nothing to do with *I. Anil*, which, though at one time largely grown in Burma and Malaya, never has found favour among cultivators in any part of the Indian Peninsula. This was, and still is, the *I. tinctoria* of cultivators in the Dutch Indies, where, however, the species is not now much favoured. Specimens of this form, evidently feral after escape, have been communicated from many places both within and beyond the limits of the area where it now is, or formerly has been, in cultivation. It is not necessary to mention all of these; some of the more outlying ones are, however, of interest, such as the Philippines; Northern Queensland (Endeavour River), where, from what Baron Mueller says, it would seem to have been taken by some agency other than human; the Laccadives, where in the Island of Kadamum it has been found by Hume and by Alcock forming thickets that cover a great portion of the island; finally, Merwara, in Rajputana, where it is not, and probably never has been, cultivated. In Rajputana the plant grown as Indigo, and, termed "Nil" by the inhabitants, is a form of the "Nil" of Egypt and Arabia, *I. articulata* Gouan (*I. argentea* L., non Burm.; *I. cærulea* Roxb.), and is quite distinct from the "Nil" of Northern India; the name given to the Madras form of *I. tinctoria* which grows in Merwara as a quite wild plant along the sides of ravines is "Jinjini," and the only use made of the plant is that its seeds are collected and eaten in years of scarcity and famine. This is one of the two forms of *I. tinctoria* included by De Candolle under his var. *α macrocarpa* of that species; the other form is our

3. The Northern cultivated form, largely in use in Northern India from the Behar and Tirhut westward to the Panjab, where its area meets that in which some form of *I. argentea* is grown, and southward to the Circars, where its area meets that in which the Madras form of *I. tinctoria* is grown. This, throughout the area specified, is the plant known as "Nil," and is the form to which the name *I. tinctoria* is applied. As has been shown, it is not exactly what Linnæus meant by *I. tinctoria;* it is, however, precisely what Gaertner intended by *I. sumatrana*, and what Lamarck has figured as *I. indica* (not the same thing as the older *I. indica* of Miller, which is *I. hirsuta* L.). In the Dutch, as in the English, Indies these two forms have been usually treated as distinct, a treatment all the more natural that in Malaya the two seem to have been grown alongside of each other and of *I. Anil*, whereas in India the two have at all periods been restricted to fairly well-defined areas, and to have been grown within these areas practically exclusively. About sixty years ago, the names "*sumatrana*" and

"*indica*" appear to have fallen into disuse in Java, and the name *I. leptostachya*, given to this form by Zollinger under the mistaken idea that this is the plant to which De Candolle applied the name *I. leptostachya*, came to be used for it. This name, *I. leptostachya*, is still in use in Java, but is no longer applied to this form of *I. tinctoria*; it connotes now an African species, *I. arrecta* Hochst., equally remote from the Candollean plant to which the name was originally given. The northern form of *I. tinctoria* extends to Formosa; it is also the form of *I. tinctoria* that was first introduced to the West Indies from the East Indies; and is the form of *I. tinctoria* figured by Sloane, t. 179, fig. 2. This makes it also the *I. tinctoria* of Lunan, Hort. Jamaicensis, in so far as that is based on Sloane's figure. The specimen from which Sloane's figure was drawn has glued down on the same page fruits of *I. Anil*, but these have not been used in drawing the figure.

If, however, the view expressed by Berg, Baker, and Vatke, that the sylvestran form of this species deserves to be recognized as a species under the name *I. Bergii* Vatke—and we are bound to admit that, apart altogether from the high authority of the writers who have given expression to the view, there is a good deal to be said for it on morphological grounds—it will become necessary to accept the view of Gaertner, Lamarck, and Zollinger, that the form cultivated in Northern India is a species apart from *I. tinctoria* L., to be known as *I. sumatrana* Gaertner. The differences between these two cultivated plants are as salient and as constant as the differences between *I. Bergii* and either of them.

There are not in collections a large number of specimens of *I. tinctoria* from America; it does not appear ever to have been greatly in favour there as a source of indigo. Very few indeed of these specimens are referable to the Madras, almost all being the northern form of the species. Most are from the West Indies; a few are from Florida (Island of Key West); none have been communicated from the continent of America. From Africa, apart from the wild form in Nubia which we think probably the original condition of *I. tinctoria*, cultivated examples have been communicated only from the Mascarene Islands, the Canaries and Cape de Verde Islands, Socotra, and from places near the coast both on the Mozambique and on the Angola-Senegal side. It is interesting to notice that practically all the specimens from Angola to Senegal are of the northern form; many of the Mascarene, Mozambique, and Socotra specimens are of the southern or Madras cultivated form.

Rumphius, Amb. v. t. 80, cited under *I. tinctoria* α *macrocarpa* by De Candolle, is to be deleted; it is a representation of *I. Anil* L. var. γ *olygosperma* Miq. (= var. δ *asperma* Zoll.), the form of *I. Anil* propagated by offsets and cuttings instead of by seeds. *I. cærulea* Roxb., doubtfully referred here by De Candolle, is the eastern form of *I. articulata* Gouan, the "Nil" of Egypt and Rajputana, as opposed to the "Nil" of Northern India.

I. madagascariensis Schrank ex Colla, Hort. Ripul. App. 2, 350 (1826), judging from description, must be referred to *I. tinctoria* L.

This plant must not be confused with *I. madagascariensis* Vatke in Bremen. Abh. vii. (1882), p. 245, also, as the name implies, from Madagascar. *I. cinerascens* DC. Prodr. ii. 226 (1825) must also be reduced to *I. tinctoria*.

I. TINCTORIA β BRACHYCARPA DC. Prod. ii. p. 225 (1825), "leguminibus abbreviatis crassioribus 3–4 spermis. *I. Guatimala* Lun. Hort. Jam. i. p. 420. Fl. Mex. ic. ined.? An species propria? (v. v. cult. in hort. Eur.)."

I. brachycarpa Graham in Wall. Cat. 5470 = *I. tinctoria* L. var. *brachycarpa* Baker, non DC., is a synonym of *I. argentea* L. var. *cærulea* (Roxb.), and has nothing to do with the *Prodromus* plants included under this variety. These plants are as follows:—(1) Two specimens of the cultivated form of *I. suffruticosa* Mill. (*I. Anil* β *polyphylla* DC.), without precise locality. One of the two is from L'Héritier, the other of unknown origin. (2) A third specimen of the same form from Trianon. (3) A specimen of the wild form of *I. Anil* β *polyphylla* from Jard. des Plantes. (4) A specimen of *I. truxillensis* (*I. Anil* α *oligophylla*) from Trianon. (5) Two specimens of *I. truxillensis* (*I. Anil* α *oligophylla*) from Jardin Botanique d'Orotava; and, lastly (6), a single specimen from Herb. Thibaud of a plant figured by Moçino & Sessé as *Indigofera guatimalensis*, referred to on page 225 of Prodr. vol. ii. line 1. It is not the *I. Guatimala* of Lunan; that plant is simply *I. suffruticosa;* it is, however, the same as *I. guatimalensis* Poeppig MSS. in Herb. Brit. Mus. The nearest ally of this plant is *I. densiflora* Mart. & Galeotti, which, however, may be distinct, as its pods have no stipe within the calyx, as is usual in this. The whole of β *brachycarpa* DC. has been transferred by Berg to *I. Anil* as *I. Anil* β *brachycarpa*. This is the form in Plant. Sintenis to which Urban limits the name *I. Anil* β *brachycarpa*. It is, however, quite distinct specifically from *I. Anil*, and must either be regarded as a variety of *I. densiflora* or as a distinct species, with the synonymy:—

I. guatimalensis Moçino, Sessé & Cervantes in Herb. De Candolle, Ic. ined.; Poeppig MSS. in Herb. Brit. Mus.; MSS. et Herb. De Candolle.

I. tinctoria var. β *brachycarpa* DC. Prodr. ii. 224 (1825) in part; Berg in Berg. & Schmidt, Offiz. Gewach. iv. (1863) in part; Urban in Plant. Sintenis, no. 5604.

Besides the Prodromus Herbarium examples, we have seen the following specimens of this plant:—Guatemala, *Bernouilli & Cario*, no. 1189, *Herb. Kew.*; *Sintenis*, no. 5604, *Herb. Brit. Mus.* Venezuela, *Fendler*, no. 1795; *Herb. Kew.* Central America, *Ruiz & Pavon*; *Herb. Brit. Mus.* Suburbs of Guayaquil, *Jameson*, no. 338; *Herb. Brit. Mus.* Cuba, *Ramon de la Sagra*, no. 94. "Indigofera de Guatemala, cult à la Havane." Peru, *Dombey*, no. 872; *Poeppig*, no. 1572.

(To be continued.)

LYTHRUM RIVULARE Wood & Evans.

By Dr. Emil Koehne.

In the *Journal of Botany* for 1901 (p. 172) is a description of *Lythrum rivulare* Wood & Evans, compared with *L. sagittæfolium* Sond. These two species are said to be tetrandrous, but *L. sagittæfolium* is octandrous, and has heterostyled trimorphous flowers. It is not a *Lythrum*, but a *Nesæa*. The two species ought to have been compared with the descriptions of all the Nesæas of the section *Salicariastrum* contained in my monograph of the genus, and in subsequent papers published by me in different periodicals. Eight species belonging to the section *Salicariastrum* are known to-day, and may be disposed as follows :—

Series 1. *Stamina 4* (raro in *Nesææ passerinoidis* floribus nonnullis 8).

A. Herbæ annuæ.
  a. Stamina sepalis opposita ut stylus exserta. Plantæ glaberrimæ foliis decussatis . . . . . 1. *N. Dinteri.*
  b. Stamina pedalis (s. calycis appendicibus) opposita. Plantæ hirtellæ foliis sparsis v. decussatis v. 3–4nis verticillatis.
    α. Petala vix 1 mm. longa v. nulla . 2. *N. passerinoides.*
    β. Petala calyce longiora. Flores dimorphi . 3. *N. lythroides.*

B. Fruticuli glaberrimi foliis decussatis v. 3nis v. nonnullis sparsis. Petalis opposita . . . . . 4. *N. Kuntzei.*

Series 2. *Stamina 8. Suffrutices v. fruticuli.*

A. Folia decussata (v. raro pro parte sparsa).
  a. Flores homœomorphi staminibus subæquilongis.
    α. Rami vetustiores fuscescentes. Ovarium ellipsoideum. 5. *N. Leideritzii.*
    β. Rami vetustiores straminei v. ochracei. Ovarium piriforme. 6. *N. straminea.*
  b. Flores 3-morphi staminibus epipetalis manifeste brevioribus. 7. *N. Schinzii.*

B. Folia in spirali disposita. Flores 3-morphi staminibus epipetalis manifeste brevioribus . . . . 8. *N. sagittifolia.*

1. N. Dinteri Koehne in Mém. Herb. Boiss. 1900, p. 25 ; in Engler's Bot. Jahrb. 29 (1900), 166.
Herero-land.

2. N. passerinoides Koehne in Engler's Bot. Jahrb. 3 (1882), 338 ; in Verhandl. Bot. Ver. Brandenburg, 30 (1888), 250 (*Ammannia passerinoides* Hiern).
Angola : Huilla.

3. N. lythroides Hiern, cf. Koehne, *ll. cc.* 338 et 250.
Mossamedes.

4. N. Kuntzei Koehne in O. Kuntze, Revis. 3, pt. ii. (1898), 97 ; in Engler's Bot. Jahrb. 29 (1900), 166.
Natal : Ladysmith.

5. N. Leideritzii Koehne in Verh. Bot. Ver. Brandenb. 30 1888), 25.

Forma a. (typica).

Forma b. *Hereroënsis* Koehne in Mém. Herb. Boiss. 1900, p. 25; in Engler's Bot. Jahrb. 29 (1900), 167.

Herero-land a. Deutsch-Südwestafrika.

6. N. straminea Koehne in Mém. Herb. Boiss. 1900, p. 26; in Engler's Bot. Jahrb. 29 (1900), 167.

Herero-land.

7. N. Schinzii Koehne in Verhandl. Bot. Ver. Brandenburg, 30 (1888), 250.

Var. *α typica* Koehne in Engler's Bot. Jahrb. 22 (1895), 151.

Var. *β subalata* Koehne, *l. c.*

Var. *γ Rehmanni* Koehne, *l. c.*

Var. *δ Fleckii* Koehne in Bull. Herb. Boiss. iii. (1895).

Upingtonia, Herero-land, zwischen Cunene und Sambesi, Transvaal, endlich im ostafrikanischen Seengebiet bei Bumpeke und Kagehi.

8. N. sagittifolia Koehne in Engler's Bot. Jahrb. 3 (1882), 339; in Verhandl. Bot. Ver. Brandenburg, xxx. (1888), 251 (*Lythrum sagittæfolium* Sond.).

Var. *α typica* Koehne in Engler's Bot. Jahrb. 22 (1895), 152.

Forma *a.*

Forma *b*, Koehne, *l. c.*

Var. *β glabrescens* Koehne, *l. c.*

Var. *γ ericiformis* Koehne, *l. c.*

Var. *δ salicarioides* Koehne, *l. c.*

Transvaal, Natal, Kaffraria.

I should like to know whether "*Lythrum rivulare*" (potius *Nesæa rivularis*) has *indeed* four stamens like *N. Kuntzei*, or eight stamens like *N. sagittifolia*. Probably it is nothing more than a form of the very variable *N. sagittifolia*.

TWO FRESH RUBUS FORMS.

By Rev. Augustin Ley, M.A.

I have the concurrence of Rev. W. M. Rogers in the advisability of giving names to the following forms of *Rubus fruticosus* L.:—

1. Rubus acutifrons A. Ley, var. amplifrons, nov. var. This recedes from the type in the following particulars:—Stem nearly glabrous. Prickles fewer, more slender, mostly declining; stalked glands and acicles very few, pricklets destitute of glands fairly numerous. Leaves nearly all ternate; leaflets large, subequal, the terminal ovate-rotund, not lobate, shortly cuspidate-acuminate; serration coarser, more open. Panicle much less interrupted, cylindrical, its upper branches subpatent; rachis straight, with fewer

prickles, but with stalked glands and hair similar to type. Floral leaves broader, many simple ones extending nearly to the blunt top of the panicle. Sepals aciculate externally, reflexed in flower, soon ascending and embracing in fruit. Flowers small, petals often narrow, greenish white.

In the subglabrous stem bearing numerous prickles which are destitute of the terminal gland, this plant approaches *R. ochrodermis* A. Ley, in which, however, such organs are far more numerous.

Conjectured by Dr. Focke (*in litt.*) to be "allied to *R. fuscus* W. & N. and *R. Læhri* Wirtg."; but upon comparison of a pretty large series clearly coming near my *R. acutifrons*, under which it seems best to place it as a variety. I have endeavoured, in the choice of a varietal name, to express both its alliance to, and the most noticeable feature of its difference from, *R. acutifrons*.

Localities. Very abundant in a large tract of woodland called Big Wood and Treville Wood, Whitfield, Herefordshire. Near Pen Selwood, Somerset!; Rev. R. P. Murray, *Flora of Somerset*, p. 117: a form connecting this with the type.

First noticed in 1896, and sent unnamed to the London Botanical Exchange Club in 1898 or 1899, but remaining unnoticed in the Club Reports for those years.

2. RUBUS DUMETORUM Weihe, sp. coll., var. TRIANGULARIS, NOV. VAR. Near vars. *ferox* Weihe and *britannicus* Rogers, from the latter of which it differs in the crowded, unequal, very stout, straight thorns, and short-stalked glands of stem and rachis; in the leaves being nearly always ternate or ternate-lobate, not quinate; their leaflets shorter, broadly triangular-ovate, acute or shortly acuminate, with shallow crenate-lobate serration, and with their under surface more constantly felted; in the panicle with long straight divaricate lower branches, often forming a triangular figure. Sepals broadly triangular, short, at length clasping.

Placed by Rev. W. M. Rogers (*in litt.*) under his var. *britannicus*, "going off towards var. *ferox*"; but, after studying the living plant twice, I venture to think that it could not be confounded, in that state, with either of these varieties, and that therefore it merits distinction and recognition as a separate variety of *R. dumetorum*. The *triangular* aspect of the very numerous broad-based thorns, of the sepals, of the spaces between the panicle-branches, of the whole panicle; and to a less degree of the leaves, their leaflets, and the leaf-serration, suggests the proposed varietal name as appropriate.

Localities. Very abundant in the valley of the Teme, both above and below Stanford Bridge, Worcestershire, in hedges and wood-borders; and ascending from the Teme valley into Herefordshire at Upper Sapey.

NOTE ON PHILONOTIS LAXA Limpr.

By H. N. Dixon, M.A., F.L.S.

Limpricht described *Philonotis laxa* as a new species in 1893 (Laubmoose, &c., vol. ii. p. 563), founded on specimens collected in the Lake of Zurich by Weber in 1884. The following are its salient characters, taken from his description:—

"Flowers and fruit unknown. Perhaps an aquatic form of *P. marchica*. Tufts very loose, flaccid, light green. Stem much elongated, often floating, thin, weak, with *few smooth* radicles, simple or divided, never with whorled branches; bearing *deciduous axillary shoots* in the upper part of the stem. Leaves *very loosely set*, spreading both wet and dry, not decurrent, lanceolate, sharply pointed, *not* plicate, *plane* at margin and with short *single* teeth. Nerve *very thin*, only 35 μ wide, ending in or below the point. All leaf-cells lax and thin-walled, chlorophyllose, 10 μ wide above and four or five times as long, below 18 μ wide and two to four times as long, here and there in upper part of lamina slightly papillose with the projecting cell-walls."

In the spring of 1900, Mr. Jas. Needham collected in a small watercourse at Crimsworth Dean, Hebden Bridge, a curious aquatic form of *Philonotis*, which he sent me for determination. About the same time I received from Mr. J. A. Wheldon an almost identical plant, collected by Mr. H. Beesley in wet places, Chorley, S. Lancs. It was evident that the description of *P. laxa* fitted these plants in almost every detail, and I endeavoured to obtain an authentic specimen for comparison. Failing, however, in this, I sent part of the gathering to Limpricht, hoping to have the determination either confirmed or corrected; in this, however, also I was disappointed. Finally I sent a specimen to Dr. C. Warnstorf, of Neuruppin, who kindly replied, confirming the identity of our plant with *P. laxa*. Dr. Warnstorf added (I translate):—"Although my plants from Belgium, Baden, and the Rhine Provinces are somewhat more robust than your specimen, it agrees in the very lax, highly chlorophyllose areolation. The upper small-leaved branches strongly recall my *Phil. rivularis*, but that has narrower cells."

The identity of the two plants in question with *P. laxa* Limpr. may therefore be considered established. Limpricht's description applies to them in almost every detail, the sole exception being that I have only very rarely found the deciduous axillary shoots present. The slender soft plants, the shortly pointed, plane and plane-margined leaves, loosely set and widely spreading, the narrow short nerve, and especially the very wide, thin-walled, richly chlorophyllose cells, separate the plant most markedly from all the ordinary forms of *Philonotis* which occur with us. Indeed it much more closely resembles loose forms of *Amblystegium Kochii* than any *Philonotis* of the *fontana* group, and perhaps in saying this one gives the best idea of its very great distinctness.

In spite of these marked characters, however, I felt very suspicious as to the specific rank of *P. laxa*, a suspicion shared by Limpricht

himself, as indicated in his description. One thing was certain, whatever the affinities of the plant they were not with *P. marchica*. That species has never been found in the British Islands, and however the case might be in other parts, it is scarcely likely to be an overlooked plant in districts so well worked as the West Riding of Yorkshire, or those divisions of Lancashire so closely investigated of late by Messrs. Wheldon and Wilson. The only species open to question were *P. calcarea* and *P. fontana*. The former has a *prima facie* claim to consideration on the ground of its wide cells, and a still greater one from the fact that in a certain soft and slender form (var. *mollis* Vent.) it acquires a not indistinct resemblance to the plants under discussion. Apart, however, from some structural differences, the station of our British *P. laxa* seems quite sufficient to preclude such an origin. *P. calcarea* is one of our most distinctly calcicolous species of moss, while *P. fontana* is, I believe quite as markedly, a calcifuge. In the case of the Crimsworth Dean locality, the soil is sand and peat, with no limestone near, nor is *P. calcarea* found in the neighbourhood. The Chorley locality, Mr. Beesley believes, was probably shale or sandstone, and certainly the associates of the *Philonotis*, viz. *Dicranella squarrosa*, *Mnium punctatum*, &c., strongly support the supposition of its being non-calcareous. Neither *P. fontana* nor *P. calcarea* was found growing near.

On my suggestion Mr. Needham made a careful search in the neighbourhood of the Crimsworth Dean locality, and found on the Yordale shale, within one hundred and fifty yards of the original station, two distinct forms of *P. fontana*, which threw a very decided and interesting light on the origin of the *P. laxa*. One of these is a slender, erect, little branched plant, in general character and build resembling *P. adpressa* Ferg., especially in the short wide leaves with lax, thin-walled chlorophyllose cells, but with a narrower nerve and more distinctly acuminate leaves; indeed, just what one might expect from a form of *P. fontana* exposed to conditions involving an excess of shade and moisture. The slender habit and lax chlorophyllose cells exhibit some approach to *P. laxa;* but in other respects the resemblance is not very marked, and the plant bears all over the stamp of *P. fontana*. The second specimen is shorter, with but slightly branched stems, somewhat soft and flexuose, and in general appearance much more like *P. laxa;* but it is evidently a less aquatic form, more robust, with the leaves as a rule closer and more highly developed—nerve stout and carinate, acumen gradually tapering, margin often slightly recurved—but with the very wide, thin-walled cells of *P. laxa*. In some of the more slender branches, moreover, the nerve is decidedly narrower, the leaves more shortly pointed, the tissue chlorophyllose, and, in short, the whole character exactly that of *P. laxa*, except that the nerve is usually in some degree stouter, and the leaf apex very slightly more tapering.

The proximity of these two plants, clearly referable to *P. fontana*, while at the same time exhibiting characters so unusual and so markedly approaching those of the aquatic or subaquatic

P. laxa, left no doubt in my mind that the latter is a derivative from *P. fontana*, marking a still further divergence from the type, and probably owing its extreme character in no little degree to the immediate influence of its surroundings. This conclusion, supported by some other forms of *P. fontana* (notably one sent by Mr. W. E. Nicholson, from Crowborough, Sussex) showing a distinct tendency in the same direction, is substantiated, not to say demonstrated, by a plant collected by Mr. Beesley near Longridge, Lancs., at some distance from, but in the same district as, Chorley. This specimen consists of moderately robust stems of not quite typical but fairly ordinary *P. fontana*, sending out numerous slender distant-leaved shoots which are identical with *P. laxa* in every respect. The stem leaves are large, widely cordate and acuminate, with stout nerve, recurved margin, and strongly papillose cells, which are *distinctly narrow and somewhat incrassate* above. We have here, therefore, to all intents and purposes, *P. laxa* and fairly typical *P. fontana* growing on one and the same plant, and I think it must be taken as conclusively proved that the claim of independent rank must be denied to *P. laxa*, and that it must be reduced to a variety of *P. fontana*. It might, indeed, be held to be merely a form induced by the local (aquatic) conditions, but this is by no means proved to be the case; and the fairly numerous stations in which *P. laxa* has now been found, ranging over a considerable part of Central and Western Europe, give it an additional claim to the rank of a variety. I propose for it the name *ampliretis*. Weber's unpublished name (*propagulifera*) appears inappropriate, as the deciduous shoots do not seem to be at all constantly present. Limpricht's name *laxa* is excluded, as Venturi has given the name to a different variety of *P. fontana* (Rev. Bry. 1882, p. 45).

The synonymy would therefore stand thus:—

Philonotis fontana Brid. var. *ampliretis* Dixon.

Syn.—*P. fontana* var. *propagulifera* J. Weber in sched.

P. marchica var. *β laxa* et *γ fluitans* Limpr. *in litt.*

P. laxa Limpr. Laubm. ii. p. 563 (non *P. fontana* var. *laxa* Vent.).

SIR HENRY COLLETT

(1836—1901).

By the death of Col. Sir Henry Collett, C.B., on Dec. 21st, 1901, science has lost a botanist. Born in 1836, he had a distinguished military career in India. He was severely wounded in the Jaintea War of 1862–3. His duties in the Military Secretariat made Simla his residence for many seasons, from May to October. He commanded with success in the reduction of the Shan Tribes of Burma. When the Chief Commissioner of Assam, the Governor-General's Agent, and the Colonel commanding were slaughtered by the degraded impure-caste half-savages of Munipoor, the Civil

and Military Government of the Province of Assam was, by the Government of India, united in Col. Collett. He justified this confidence by the speedy restoration of English authority, almost without bloodshed; while he showed remarkable capacity in the Civil administration of the Province.

Col. Collett had from youth a turn for science. In his earlier days in India he had devoted time to astronomy. During his residence at Simla, a small band of ardent naturalists formed the Simla Natural History Club, and Collett left astronomy for botany. The Simla Club printed papers of Collett—among others: "On the long- and short-styled flowers in *Reinwardtia*" (a case of trimorphism), "On the Fertilization of Simla Orchids," "On the Ferns of Simla."

When on service in the Shan States, Collett collected eight hundred Phanerogams, which formed the subject of a paper by himself and Mr. Hemsley in Journ. Linn. Soc. xxviii. (1891), pp. 1–150. Among these are new and fine species, such as *Rosa gigantea*, *Lonicera Hildebrandiana* (with a flower 7 in. long), *Bulbophyllum comosum*, *Cirrhopetalum Collettianum*,—all of which treasures Collett got alive to England.

Before leaving India, the Government offered him the post of Quartermaster-General; and after his retirement, a telegraph from Government, offering him a first-class divisional command, overtook him at New York.

Among the large English population of Simla are many who had paid no attention to botany in England, but whose souls are stirred by the novel vegetation and wish to know something about it. The only book (practically) that comprises the Simla Flora is the *Flora of British India*, of Sir J. D. Hooker. This work in seven solid volumes, describing fifteen thousand species, does not meet the want of those who propose to begin their botany at Simla. Since his retirement to England, Col. Collett has devoted the principal part of his time for science to the preparation of a Flora of Simla, complete as to Phanerogams, for an area round Simla which includes upwards of a thousand species, and with two hundred figures in the text. This book is designed to serve as a handbook for the unlearned collector; but it is an important contribution to our knowledge of the North-west Himalaya, and must command the attention of all scientific writers on the subject. Sir H. Collett's MSS. of this book are fortunately complete; two-thirds of the work is already printed off; also all the figures; so that it will be easily got out by a competent editor.

Sir Henry Collett had the habits of a student, and read upon various subjects (including the chief botanic physiology published), so as to make the gist of the matter his own. As a man he was beloved by all. We attempt here to record briefly what he has done for Botany.

C. B. Clarke.

RALPH TATE

(1840–1901).

Ralph Tate was born at Alnwick in 1840. When only twelve years old he began the study of geology at the instigation of his uncle George Tate, the author of the "Fossil Flora of the Eastern Broads." At the age of seventeen he obtained an exhibition of £80 at the School of Mines; after this he became a science teacher and lecturer under the Department of Science and Art, in which capacity he went to Belfast. Here he conducted classes in various branches of natural science with marked success, and in 1863 took a leading part in establishing the Belfast Naturalists' Field Club, for the benefit of whose members he published, in 1863, his *Flora Belfastiensis*. This was "hastily prepared," and "does not profess to be exhaustive; it is, however, original, and, notwithstanding several errors, it was a step in advance."* In 1865 he spent four summer weeks in Shetland, and published the botanical results of his researches in this Journal for 1866, pp. 2–15; he distributed sets of his plants, the first of which is in the National Herbarium. Some corrections of nomenclature by H. C. Watson and Mr. Carruthers will be found on pp. 348–51. In the same volume (p. 377) Tate proposed a "new variety" of *Andromeda Polifolia*, which he called *curta*, from the short peduncles; this, though based on an Irish plant, is not referred to in *Cybele Hibernica*, on the first edition of which Tate published some notes in this Journal for 1870 (p. 80).

In 1867 Tate visited Venezuela and Nicaragua as a mining expert; during this period he devoted his attention chiefly to conchology, but also made a collection of plants (at Chontales), sets of which are in the National and Kew Herbaria. On his return to England he became director of some mining schools in Durham. In 1875 he was appointed Elder Professor of Natural Science at the Adelaide University, a position which he occupied until his death on the 20th of last September. Here he at once took up a leading position. He was first President of the Biological Section of the Australasian Association for the Advancement of Science formed in 1888, and delivered before it an able address on "The Influence of Physiographic Changes in the Distribution of Life in Australia." Although more especially occupied with geology, botany was not neglected, as will be seen from the numerous papers contributed by Tate to the Transactions of the Royal Society of Australia. He made large collections on the various expeditions placed under his charge by the South Australian Government; among the plants collected by him in Arnhem's Land in 1882 was the Verbenaceous genus *Tatea*, named in his honour by F. von Mueller; and he is also commemorated in the names of several species. In 1890 Tate

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* Preface to *Flora of North-East of Ireland* (p. xxii), by Mr. S. A. Stewart, whose help is acknowledged by Tate in the *Flora Belfastiensis*.

published a conveniently arranged *Handbook of the Flora of Extra-tropical South Australia*, which was noticed in this Journal for that year (p. 285), and in 1896 issued a Report on the Botany of the Horn Expedition. The *Victorian Naturalist* for October last, to which we are indebted for some of the above facts, concludes its notice by saying: "We may with safety assert that his place as an all-round naturalist, thoroughly conversant with the flora and fauna, living or extinct, of his adopted land, will probably long remain unfilled."

BOTANICAL EXCHANGE CLUB REPORT, 1900.

[The following are among the more interesting notes published in the above-named Report, which was issued on Aug. 8, 1901, and is edited by Mr. J. Walter White, the distributor for 1900.]

Ranunculus cambricus Arth. Bennett. Root from Llyn Coron, Anglesea. Hort. Croydon, 1894. Cultivated specimens of this were submitted to Herr Freyn, who suggested "*R. carinatus?* Schur." To this I cannot agree. *R. carinatus* Schur. is a var.? of *R. confusus* G. et G., while *cambricus* when growing (I had it in the living state for eight years) is essentially a modification of *R. fluitans* on a small scale. By this I do not imply that it is a *fluitans* form, but that the habit of the plant is very near that of *fluitans* growing under cultivation. Unfortunately, I could never get it to fruit, and the original specimens—"Coron Lake, Anglesea, J. Griffith"—are only in flower. Its position must remain doubtful until a series is gathered. See *Report*, 1892, p. 351.—Arthur Bennett. "*R. cambricus* J. Griffith, *Fl. Anglesea and Carnarvon*, p. 2, where this name is erroneously attributed to Mr. Arth. Bennett, who described it in *Science Gossip*, 1892, p. 198, as *R. aquatilis* var. *cambricus*. These specimens are from the classic locality, Llyn Coron, Anglesea, where this year I also found it as *forma terrestris* growing on the margin of the lake. I first found it at Llyn Coron in July, 1875, when I sent specimens to Dr. Boswell Syme, who referred it to *R. fluitans* var. *Bachii*. The plant is remarkably unvarying throughout the lake, and the peculiar curve cf the leaflets may be noticed even in the mud form. No trace of floating leaves appears to be produced, and even in the terrestrial form the leaflets show no sign of coalescing. The petals are narrow, and so give a starlike appearance to the flowers. In the *London Catalogue* this plant is doubtfully put as a variety of *Ranunculus fluitans*, and it is possible that this view may be correct. Mr. Griffith records *R. fluitans* from the outlet of Llyn Coron growing with *R. pseudo-fluitans*. At any rate, it can scarcely be a form of *peltatus*. Herr Freyn, some years ago, referred it to *Batrachium carinatum* Schur., but Mr. Arthur Bennett did not agree with this determination. I have sent a series of specimens to my friend Herr Freyn, and I hope a definite name may shortly be given to this interesting Batrachian." — G. Claridge Druce.

R. fluitans Lam. var *Bachi* Wirtgen. In the sluice feeding the paper-mill at Ayton, 12th and 13th July, 1900; and in the Eye Water between East Reston and Aytonlaw (which feeds the paper-mill sluice), 16th July, 1900; both stations in North-east Berwickshire. I have seen the same plant in the same county in the rivers Whiteadder and Blackadder, and I collected it in the river Tweed between Cornhill and Wark, near Coldstream, v.-c. 68, 17th July, 1900. Mr. James Groves has confirmed the naming. — Charles Bailey.

R. radians Revel. Marsh ditches, Yatton, North Somerset, 13th June, 1900. The rhines draining the lowlands of North Somerset yield plenty of Batrachian material. This plant is a form of *R. heterophyllus* Fr. with floating leaves coriaceous in texture, hairy beneath, and divided deeply into straight-sided wedge-shaped segments that are often themselves stalked, and sometimes merge gradually into capillary divisions like those of submerged leaves. This is my idea of *R. radians* derived from an available published description.—Jas. W. White.

Viola ———. Barren field outside Steyn Wood, Bembridge, Isle of Wight, 6th June, 1900.—C. E. Palmer. "Prof. von Borbás, of Budapest, to whom I submitted specimens of this plant, has determined it to be *V. banatica* Kitaib. in Roem. & Schult. *Syst.* v. p. 382, non Reichb. *Icon.* The following is the original description of this species:—'Caule angulato decumbenti-diffuso, foliis inferioribus cordatis, superioribus ovato-oblongis, dentato-crenatis, stipulis runcinato-pinnatifidis, corollis calycem glabrum vix excedentibus. Intermedia quasi *tricolorem* inter et *arvensem* β; statura tricoloris, corolla, præter calycem, *arvensis* β.' Hab. (of type) in Banat. I am not aware that this has ever before been recorded for Britain."—E. G. Baker.

Dianthus gallicus L. St. Ouen's Bay, Jersey, 31st July, 1900. This beautiful species grows in one spot only in the Channel Islands. Even when the exact locality of the plant is known, it is extremely difficult to find, so much so, that three of us this year, all knowing the place well, had trouble to come on it. The common abounds with *Armeria plantaginea*, and the resemblance which these two plants bear to one another, flowering at the same time, is really extraordinary. At a very short distance they are indistinguishable; and to my mind this fully accounts for the pink having so long escaped notice. I cannot agree with the opinion expressed (*B. E. C. Report*, 1898) that this plant has been introduced. It occurs on the coast of Normandy and Brittany, where grow other plants that also occur with us—e. g. *Linaria Pelisseriana*, *Helianthemum guttatum*, *Romulea*, etc. During the last few years at least a dozen species have been added to the flora of the Channel Islands under conditions that prevent the supposition of introduction; and of course all these had previously escaped the observation of botanists.—Stanley Guiton.

Silene conica L. Sandy heathland pasture near Parkstone, Dorset, in fair quantity over a very limited area, apparently native,

14th June, 1900. This seems to be quite a different station from the one reported by Mr. Hussey, 1886; from what the Rev. W. Moyle Rogers tells me, they would be nearly two miles apart. In my *Flora of Bournemouth* I followed the *Flora of Dorset*, characterizing the species as "alien?" in the county, but, after seeing the plant *in situ*, I am satisfied that it is native, and it is easy to account for its having been overlooked. I send out single specimens rather than full sheets, in order to distribute as widely as may be these Dorset vouchers.—E. F. Linton.

Rubus Newbouldii Bab. Form with exceptionally acuminate leaflets. Burwardsley, Cheshire, 23rd July, 1900. I send this plant as specially interesting because I believe it was after seeing it for the first time that Mr. Moyle Rogers wrote in *Handbook of Brit. Rubi*, p. 74, under *R. macrostachys* P. J. M.: "not always distinguishable without difficulty from *R. Newbouldii*." After seeing further specimens this year, he suggests the note I have put on the labels, and writes: "I now accept your name, *R. Newbouldii*, for this plant in preference to *R. macrostachys* P. J. M., formerly suggested by me; because, after studying it side by side with your ordinary Cheshire *Newbouldii* in the living state in successive years, you are better able to judge of the correctness of the name than I can be from dried specimens only, especially as I derive such imperfect knowledge as I have of *R. macrostachys* solely from dried specimens of British plants for which Dr. Focke has suggested that name. These last, so far as I can judge from dried specimens, still seem to me sub-Bellardian, and closely allied to *R. fuscus*, and therefore distinct from the more Radulan *R. Newbouldii* as I have seen it growing in some quantity in Salop, and also as it is represented by your strong Edge Green plant." I might add that the growing plant, in colour and facies, does not in the least recall *R. fuscus*.—A. H. Wolley-Dod.

R. Bucknalli J. W. White. Near Mordiford, Herefordshire, July and August, 1899. The above name was suggested for this plant by Rev. W. M. Rogers, after inspecting a large number of dried specimens. Mr. Rogers writes to me on the Mordiford plant as follows: "Hardly differing from *R. Bucknalli* J. W. White (*Journ. Bot.* 1899, p. 389). Perhaps it might come under that as a var., with leaflets less conspicuously imbricate, and terminal leaflet more frequently oval or slightly obovate than broadly ovate, with base less constantly cordate. In *R. Bucknalli* the sepals are described as reflexed after flowering, and 'a fructu laxe reflexis.' (My specimens show no fruit.) In the Mordiford plant they are erect in fruit. The latter also seems to be without the 5-nate panicle leaves which are rather frequent in the former. In stem, flowers, outline of panicle, etc., they seem practically identical; but, of the two, your plant seems rather nearer to *R. corylifolius*." Mr. Rogers adds: "On further comparison of your plant with Mr. White's *R. Bucknalli*, I see that your stem is much less densely hairy than his, and apparently without the 'resinous or glandular exudation' of which he speaks. Still, they seem too near to make

two species of—the flowering panicles especially appear indistinguishable." From the points admirably noted by Mr. Rogers it would be easy to draw up a short varietal description, should this Herefordshire plant be deemed worthy of publication, of which probably it is not worthy, placing it under *R. Bucknalli* under the name "var. *vallicularum*, nov. var.," this being the name I proposed for it before receiving the above communication from Mr. Rogers. It occurs abundantly on the borders of the Haugh Wood, Mordiford; also on the borders of Yatton Wood, some miles further south, Herefordshire.—AUGUSTIN LEY. "This is very satisfactory *Bucknalli*, and of much interest to me. The points of difference noted above, of which those relating to the foliage seem the more important, are to my mind insufficient for separate recognition. I am glad to see this plant from Herefordshire."—Ed. [J. W. WHITE].

Chrysanthemum Parthenium Pers. Balsall Common, Warwickshire, August, 1899.—H. BROMWICH. "A small-flowered many-headed variety with narrower leaves, oblong instead of the more usual ovate-oblong shape, and with one more pair of pinnæ than the average. It may perhaps deserve a name, such as var. *micranthum*, if not hitherto described; for though in regard to its ray-flowers it lies about half-way between the type and a form from Sweden labelled var. *eradiatum*, in that variety the heads appear to be few, full-sized, and distant. I do not know Reichenbach's var. *parthenifolium*."—E. F. LINTON.

Cotula coronopifolia Linn. In ditches in the flat ground near Leasowe Lighthouse, and in the damp hollows of the sandhills, and by the sides of the embankment, towards Hoylake, Wirral peninsula, Cheshire, 7th July and 18th August, 1900. A few specimens only sent as vouchers for this species retaining its ground; it has greatly extended its area since it was recorded in the *Report* for 1885, p. 131.—CHARLES BAILEY.

Teucrium Scordium L. In the Thames meadows above Oxford, on the Berkshire side of the river Thames, September, 1900. This very interesting species, although recorded by Dr. Lightfoot about 1780, has not been found since Sowerby's specimen was obtained. The head level of the Thames water has been lowered in recent years, so that the place where it grows is now more readily accessible. It is one of the four plants which I feared had been extirpated in the county; and another, *Inula Helenium*, has once more appeared in the locality mentioned in Walker's *Flora* of 1834, where its temporary loss was occasioned by rabbits, which bit it close to the soil.—G. CLARIDGE DRUCE.

Polygonum mite Schrank, forma alba. I think I am right in identifying this pretty form with the above name. It was abundant over the bed of a dried-up pond, and for some distance along a ditch by the road between Hurst and the Loddon, Berks, September, 1900.—G. C. DRUCE. "Is a rather strong plant of *P. minus* Huds. The white flowers are very unusual in this species. I do not remember to have met with them before."—E. F. LINTON.

Potamogeton lucens, var.? Pond by Lough Neagh, Glenary, Co. Antrim. No fruit. Smaller than *P. lucens*, which grows in the lake near.—C. H. Waddell. "This seems on the evidence of the specimens to be a small state of *P. lucens*. I have often found the same small-leaved form growing with ordinary *lucens*, and have noticed it changing into more robust and typical states such as *acuminatus* or *cornutus*. Indeed, I have gathered specimens from the same rootstock which fairly represented *oralifolius* M. & K., the ordinary typical *lucens*, and *cornutus* Presl. It is difficult to name imperfect specimens like the present with certainty. In this group of Potamogetons, named as one species (*P. Proteus*) by Chamisso, the whole plant is necessary in many cases to enable even the most skilful botanist to decide between *lucens* and *Zizii*, on the one hand, or between *Zizii* and *gramineus* (*heterophyllus*) on the other. *P. lucens* has the leaves all shortly stalked, *P. Zizii* has some of the lower leaves sessile, and the upper leaves are often long-stalked; always, I think, longer-stalked than those of *P. lucens*. If Mr. Waddell will examine this plant in the living state next summer, he will probably find no difficulty in naming it correctly. If sessile leaves occur, the plant is a form of *P. Zizii*. If no land forms are met with around the edges, or dried-up parts of the pond, and if the stem-leaves are all stalked, then the plant may be safely named *P. lucens*. May I suggest to members of the Club that it is necessary in the case of critical forms of Potamogetons to collect as complete specimens as possible, especially when neither flowers nor fruit are present. Also I would suggest that specimens of *P. lucens*, *P. Zizii*, and *P. gramineus* should be collected and sent for distribution from as many localities as possible. Unless this is done, we shall miss many interesting forms of great value to students of the genus; and many forms which are probably due to temporary conditions may never recur."—Alfred Fryer.

Carex rostrata Stokes, forma. This plant grew in the little mountain lake Llyn Cwn, which is nearly two thousand feet above sea-level, and lies above Cwm Idwal, at the base of the final ascent of the Glyder. It was the only form then growing in the lake, whence Mr. Griffith in his *Flora of Anglesey and Carnarvon* records the variety *elatior* Blytt; and an identical form also grew in Llyn-an-Afon, the locality for *Potamogeton Griffithii*, whence the var. *elatior* has also been recorded. Neither of these rocky mountain lakes appears quite likely places for Blytt's plant, but it may be that different seasons may yield varying forms, and my experience is of two years only.—G. Claridge Druce.

SHORT NOTES.

Solanum rostratum Dunal (p. 42). — This species has appeared as a ballast plant about Liverpool in most years between 1887 and 1901. It has been seen by more than one observer chiefly near the sandhills to the north of Liverpool, and about the canal-banks at Aintree. This port is noted for its numerous interesting strangers, some of which appear rarely, and others recur in most years in the same places, showing that they may be becoming naturalized. In the forthcoming *Flora of Liverpool* I am including as many of these casuals as possible.—C. Theodore Green.

Limerick Rubi.—During a visit to the County Limerick in July and August, 1901, I gathered some brambles which have been determined for me by the kindness of Mr. Moyle Rogers and Mr. Augustin Ley. Among them was one bramble new to Ireland, and five others new to the Co. Limerick. They are as follows :—

New to Ireland.—*Rubus radula* var. *anglicanus* Rogers.

New to Co. Limerick.—*Rubus pulcherrimus* Neum. — *R. macrophyllus* var. *Schlechtendalii* Weihe (form of). — *R. Questierii* Lefv. & Muell. — *R. micans* Gren. & Godr. — *R. hirtifolius* var. *danicus* Focke.—Eleonora Armitage.

NOTICES OF BOOKS.

P. Bubani: *Flora Pyrenæa*, vol. iii. pp. 431. Hoepli, Milan.

According to promise, the third volume of this posthumous Flora appeared last year; it comprises the *Thalamifloræ*, and completes the Dicotyledons, among which are placed the orders *Phytolaccaceæ*, *Scleranthеæ*, and *Paronychieæ*. There are altogether thirty orders, making with the rest of the Dicotyledons in the previous volumes 101 orders. The *Thalamifloræ* contain 539 species, which are placed in 138 genera. The largest orders are *Cruciferæ*, 144 species; *Alsineaceæ* (*Caryophyllaceæ*), 104; and *Ranunculaceæ*, 85. The corresponding numbers of species (including hybrids) in Gautier, Cat. Raisonné Fl. Pyrén.-Orient. (1898), are 515, 134, 106, and 87, respectively. There are no new genera or species described, though many new generic and trivial names are given to previously known plants, and reasons are supplied for these changes. For instance, in *Paronychieæ*, p. 6, *Paronychia* is discarded, and *Ferriera* substituted. The apology offered is as follows: *Paronychia* Clus., Juss., Dioscor. l. 4, c. 54, with leaves larger than those of *Euphorbia Peplus*, cannot belong to any Greek or even to any European species of the genus so called by modern botanists; and it can be scarcely believed that it includes *Polycarpon tetraphyllum*, as Anguillara contended. However, as doubt exists in many minds, it is undesirable to change the name of the order until a better interpretation is discovered. One declines to continue for the genus the name adopted without any confidence by Clusius, and it is

therefore now called in honour of Anthony Ferrière, a Toulouse horticulturist, who was of very great help to La Peyrouse, his patron, in the investigation of Pyrenean plants.

Again, in the same order, *Telephium* is rejected, and the new name, p. 17, *Raynaudetia* is used in its place, with the following explanation:—The name *Telephium* Tournef. has been variously used, and has served chiefly for species of *Sedum*, as well as for species of *Cotyledon*, *Crassula*, and *Kalanchoë;* Guilandinus and Cæsalpinus, moreover, have made *Telephium* the same as *Coronilla scorpioides*, and K. Bauhin agreed; Laguna and others, according to Dodonæus, made it *Cochlearia officinalis;* Columna made it *Zygophyllum Fabago;* and Buxbaum called *Ammodenia peploides* (*Arenaria peploides* L.) a *Telephium;* some of the fathers saw *Telephium* in species of *Cerinthe*, of which one is figured as *Telephium* (according to Balog) in the celebrated Neapolitan codex of Dioscorides preserved at Vienna; *Sisymbrium Thalianum* stands in the minds of some, according to Dalechamp, for the *Telephium* of the ancients; lastly, Imperatus regarded *Telephium Imperati* L. as the true *Telephium*, but this was undoubtedly a very false opinion. Pena & Lobel, Stirp. Advers. p. 405, were apparently the first to treat of this plant, and it does not matter though they said that the flowers were golden yellow, inasmuch as the dried specimens (not the living ones) observed by them could show their petals turned into a yellow colour, as has been noticed by J. Bauhin, Hist. Plant. ii. l. 13, p. 20, f. 4 (1651); the dried plant was sent to them by James Raynaudet, an Aix druggist, who received it from Mount Bonaventura, not far from Aix, and to whom it is desired to dedicate this genus, the name of Dulac being despised. The last of these words refer to the synonym, quoted at p. 18, of *Merophragma terrestre* Dulac, Fl. Hautes-Pyrén. p. 365 (1867).

As Bubani died more than thirteen years ago, and his manuscript was mainly written many years still earlier, his critical knowledge of species was not on a level with the present standard; nevertheless, his notes with regard to closely allied forms or species are valuable. The species kept up by him were drawn on moderate lines. Thus, in the genus *Spergularia* he had two species—*S. salina* Presl, and *S. rubra* Presl; under the former he cited as synonyms *Lepigonum medium* and *L. marginatum* Koch, *Arenaria marina* Auctor., *L. neglectum* Kindb., *A. pentandra* Banks & Soland., *A. glandulosa* Jacq., &c., and he mentioned a robust plant pilose-glandular on its upper part peduncles and calyces, to which he scarcely hesitated to refer *S. macrorrhiza* Gren. & Godr. He also drew attention to the character of the seeds, which have in some cases winged margins and sometimes are not winged, and to the variation in the shape of the seeds. He seems to unite under this species the three species (or at least the two latter of them), which Babington called *Lepigonum rupicola*, *salinum*, and *marinum*, respectively; but the only plate quoted from *English Botany* is t. 958 of *S. marginata*. If another critical genus be selected—*Fumaria*—it is seen that among British species or names he has *F. capreolata* L. (for which he correctly quotes Engl. Bot. t. 943), *F. muralis*

Sond. (perhaps not the plant so called by British botanists), *F. officinalis* L. (Engl. Bot. t. 589) which he calls *F. vulgaris* J. Bauh., *F. densiflora* DC. (for which he quotes *F. micrantha*, Engl. Bot. Suppl. t. 2876), and *F. pariflora* Lam. with which he unites Engl. Bot. t. 590 and (*F. Vaillantii*) Engl. Bot. Suppl. t. 2877.

The section of *Ranunculus*, which contains the water-crowfoots, Bubani prefers to call *Euranunculus* instead of *Batrachium*. He says that *Batrachium* in Greek is the same as *Rana* in Latin, the name of the frog, and entered into the title of one of the minor poems ascribed to Homer, and that the words are absolutely synonymous, and properly apply to species of the genus which grow in swampy and watery places; although the name of the genus need not be changed, that of the section ought to be altered into *Euranunculus*. Of this section he has six species:—1. R. FLUITANS Lam. (Engl. Bot. Suppl. t. 2870), to which he refers *R. fluviatilis* Willd. and *R. pumilus* Poir. 2. R. TRICOPHYLLUS Chaix [*trichophyllus*], to which he unites *R. Drouetii* Reut., ? F. Schultz, *R. pantothrix* Sav., *R. paucistamineus* Tausch, *R. aquatilis* var. *capillaceus* Kunth, *R. Bauhini* Tausch ?, *R. Godronii* Gren., *R. minutus* Döll., and *R. radians* Revel ex Bab. 3. R. CIRCINATUS Sibth. (Engl. Bot. Suppl. t. 2869), to which he unites *R. fæniculaceus* Gilib. 4. R. AQUATILIS Dodonæi (Engl. Bot. t. 101), under which he cites *R. natans* Pourr., *R. spissophyllus* and *R. amphibius* Pourr.?, *R. intermedius* Knaf, *R. Baudotii* Godr.?, *R. floribundus* Bab.?, *Batrachium aquaticum* Wimm., *B. truncatum*, *aquatile*, and *penicillatum* Dumort. 5. R. HOLOLEUCUS Garcke, Lloyd, to which he unites *R. tripartitus* b *obtusifolius* [*obtusiflorus*] DC. and *R. Petiveri* Coss.; and 6. R. HEDERIFOLIUS Salisb. (Engl. Bot. t. 2003), under which he quotes *R. hederaceus* L., *R. chrysosplenifolius* Pourr., and *R. papillatus* Dulac. Of these six species, 5. *R. hololeucus* is not known to occur in Britain; the other five species are treated as covering ten or eleven species enumerated in *The London Catalogue of British Plants*, ed. ix. (1895). The manuscript names—*R. amphibius* Pourr., p. 404, *R. chrysosplenifolius* Pourr., p. 405 (*R. chrysoplenium* on p. 406, where it is stated that Pourret considered it intermediate between *R, hederifolius* and *R. aquatilis*), and *R. spissophyllus* Pourr., p. 404—are additions to the synonymy, and were obtained from the Madrid herbarium. The remarks on the species prove that great pains have been taken in their treatment. The varieties given by Linnæus to his *R. aquatilis* are doubtless correctly referred, namely, β. to *R. circinatus* Sibth. (accidentally printed in the note—p. 403—*R. uncinat.* L.); γ. to *R. trichophyllus* Chaix; and δ. to *R. fluitans* Lam. *R. Drouetii* F. Schultz is said to be a plant apparently intermediate between *R. trichophyllus* Chaix and *R. circinatus* Sibth. The absence from the flora of *R. cœnosus* Guss. or *R. Lenormandi* F. Schultz is noted in the author's preface, i. p. 4.

The sympathetic reader of this work, while admiring and appreciating the vast amount of care and learning displayed, cannot but feel regret that the author's plan of nomenclature had not been reconsidered before publication.

W. P. HIERN.

The Flora of Guernsey and the Lesser Channel Islands—namely, Alderney, Sark, Herm, Jethou, and the adjacent Islets. By Ernest David Marquand. With five Maps. London: Dulau & Co. 1901. 8vo, cloth, pp. 501. Price 10*s.* 6*d.* net.

The *Primitiæ Floræ Sarnicæ* of the late Prof. Babington bears the date of 1839, since which time no general flora of the islands has appeared. Mr. Marquand, in a paper on the Flora of Herm, read before the Guernsey Natural History Society in 1889 (reprinted from its Transactions in 1891), mentioned that he was engaged on a Flora of Guernsey. In 1890 he gave us one on the Flora of Jethou; in 1892, one on the Mosses, Hepaticæ, and Lichens of Guernsey; and in 1899, one on the Flora of Alderney. These he has now brought together and completed in the present work, which includes lists of the flowering plants, ferns and allies, Characeæ, mosses, Hepaticæ, Fungi, seaweeds, fresh-water Algæ, Desmids, and Diatoms. There is a general index map, and separate maps are given of Guernsey, Alderney, Sark, and Herm. Each island and islet has an introductory chapter of much interest. That on Guernsey discusses the climate and geology, giving a list of one hundred and eighty-eight plants found in flower in December from the 4th to the 31st, of which about fifty were fairly common throughout the month; then comes a botanical section, with various lists, &c., relating to Watson's types, &c.; and a history of the botany of the island. 312 pages devoted to Guernsey flora; Alderney has 65, Sark 35, Herm 13, and the other islets 22. A "List of Jersey plants not found in the other isles." Separate Indexes are given for Guernsey and Alderney and Sark, the plants of the other islands not being indexed; this we think an unsatisfactory and inconvenient arrangement.

The work is very clearly printed; full lists of localities are given, with here and there interesting but somewhat diffuse notes; the *patois* names where known, as well as those in use in Normandy; the nativity of the species, and its first record for the flora. Mr. Marquand has had access to the very interesting collection of Guernsey plants that formerly belonged to Joshua Gosselin who published a list in Berry's *History of Guernsey* in 1705, a few particulars of whom are given from his great-granddaughter. For *Cicendia pusilla* he gives the date of 1861 with a doubt; this was recorded by Babington in the *Botanical Gazette* for 1850, p. 327, as found by Mr. Townsend, but I have reason to believe that he afterwards found Capt. Gosselin was the real discoverer.

Mr. Marquand has done his work carefully and well, and has brought together most of the scattered material relating to the botany of the islands. We miss, however, any reference to the Rev. T. Salwey's "Contributions towards the Cryptogamic Flora of Guernsey," an important paper which appeared in Ann. Nat. Hist. iii. 22–29 (1849) and in the Transactions of the Botanical Society of Edinburgh for 1850, pp. 71–78.

Arthur Bennett.

*ARTICLES IN JOURNALS.**

Annals of Botany (Dec.).—S. H. Vines, 'Proteolytic Enzyme of *Nepenthes*.'— A. W. Hill, 'Sieve-tubes of *Pinus*' (3 pl.).— L. Kny, 'Correlation in growth of roots and shoots.' — H. G. Timberlake, 'Starch-formation in *Hydrodictyon*' (1 pl.). — W. C. Worsdell, 'Morphology of 'flowers' of *Cephalotaxus*' (1 pl.). — K. Miyake, 'Fertilization of *Pythium deBaryanum*' (1 pl.). — E. A. N. Arber, 'Effect of nitrates on carbon-assimilation of Marine Algæ.' — A. Howard, *Diplodia cacaoicola* P. Henn. (1 pl.). — L. A. Boodle, 'Anatomy of *Gleicheniaceæ*' (2 pl.). — W. T. Thiselton-Dyer, 'Haustorium of *Loranthus aphyllus*' (1 pl.).

Botanical Gazette (26 Dec.). — J. H. Faull, 'Anatomy of *Osmundaceæ*' (4 pl.).

Botanical Magazine (Tokyo). — (20 Nov.). J. Matsumara, 'Coniferæ of Loochoo and Formosa.' — T. Makino, 'Flora of Japan' (cont.).—B. Ikeda, 'Double fertilization in *Tricyrtis hirta*' (cont.).—T. Kawakami, 'Forest-trees of Island of Etorofu.'

Bot. Zeitung (15 Jan.).—C. Ternetz, 'Morphologie und Anatomie der *Azorella Selago*' (1 pl.).

Bull. de l'Herb. Boissier (31 Dec.). — O. & B. Fedtschenko, 'Flore de la Crimée.'—L. Blanc, 'Projet de Cartographie botanique.' — F. Stephani, 'Species Hepaticarum' (cont.). — G. Hegi, 'Das Obere Toesstal' (cont.).

Bull. Soc. Bot. France (5 Jan.). — (xlviii; sess. extraord. en Corse, 1901).— L. Lutz, 'Flore de la Corse.'— M. Gandoger, 'Les *Astragalus* américains.' — Id., 'Protéacées de l'Afrique australe.'— R. Maire, 'La taxonomie des Basidiomycétes.'—M. Hue, 'Causerie sur les *Pannaria*.' — C. Gerber, 'Cas de Cléistogamie chez une Crucifère (*Biscutella*).'—F. Gagnepain, 'Zingiberacées nouvelles.'

Bull. Torrey Bot. Club (30 Dec.). — J. C. Arthur, 'New Uredineæ.' — A. Eastwood, 'Californian Delphiniums.' — A. D. Selby, 'Germination of seeds after immersion in liquid air.'—J. H. Barnhart, 'Dates of Elliott's 'Sketch of Botany of S. Carolina.''

Gardeners' Chronicle (4 Jan.).—'*Helichrysum Gulielmi* var. *Meyeri*' (fig. 1).

Journal de Botanique ("Novembre"; received 6 Jan.).—P. Guérin, 'Développement de la graine de quelques Sapindacées' (concl.).—P. Van Tieghem, *Rhizanthemum*, gen. nov. (*Loranthaceæ*).—C. Sauvageau, 'Les Sphacelariacées' (cont.).—E. Bescherelle, 'Récoltes bryologiques de P. Mauryau Mexique.'

Malpighia (xv. fasc. 4–6; received 24 Jan.). — V. Bartelletti, 'Studio monografico delle *Ochnaceæ*' (7 pl.).—E. Paratore, 'Sul polimorfismo del *Bacillus radicicola*.' — Id., 'Ricerche sui tubercoli delle Leguminose.'—E. Villari, 'Primi saggi di studi sull' achenio.'

New Phytologist (23 Jan.).—A. C. Seward, 'Botanical teaching in University Classes.' — F. F. Blackman and A. G. Tansley, 'Revision of classification of Green Algæ.'

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* The dates assigned to the numbers are those which appear on their covers or title-pages, but it must not always be inferred that this is the actual date of publication.

Oesterr. Bot. Zeitschrift (received 20 Jan.).—A. v. Hayek, 'Zur Blattanatomie von *Lygeum sparteum* und *Macrochloa tenacissima*.'—C. v. Keissler, 'Das Phytoplankton des Nussensees bei Ischl.'—E. Hackel, 'Neue Gräser' (*Aphanelytrum*, gen. nov.).—J. Freyn, 'Plantæ Karoanæ (cont.).—A. Paulin, 'Das Vorkommen von *Viola cornuta*.'

Rhodora (Dec.)—M. A. Day, 'Herbaria of New England' (concl.).—F. S. Collins, 'Notes on Algæ.'—M. L. Fernald, 'Fall Dandelions [*Leontodon*] of N. America.'—O. Ames, '*Lobelia inflata* × *cardinalis*.'

BOOK-NOTES, NEWS, &c.

The Association Internationale des Botanistes, founded last August at Geneva, have purchased the *Botanisches Centralblatt*, which is now continued as the organ of the Association. It appears weekly, and is to contain abstracts of all important publications on botanical subjects. Dr. J. P. Lotsy, of Leyden, the President of the Association, is editor-in-chief, with a very large staff of "special editors" in different countries. Those for England are: Miss E. S. Barton (Algæ), Prof. Farmer (Cytology), Mr. A. Gepp (Archegoniatæ), Mr. B. D. Jackson (Phanerogams), Dr. D. H. Lang (Morphology), Mr. George Massee (Fungi), Dr. D. H. Scott (Palæontology), and Prof. Vines (Physiology).

There can be no doubt as to the utility of such a record, but the two numbers before us as we write suggest the necessity of greater care in detail. For example, the date of publication of the papers reviewed is more often than not omitted, and the misprints in the English notices, both as to spelling and punctuation, suggest that the proofs have not been submitted to the writers. Thus on one page (62) we have "A stricking, variety": "M. *J.* M." as "the initials of Dr. M. *J.* Masters"; and "Obituary Davidson, George": on the same page, as well as in the index, Mr. Spencer Moore's description of *Aster subcærulea* is placed under Dr. Rendle's name. A separate index seems hardly necessary for each number of thirty-two pages, even if it were more helpful than at present is the case—*e.g.* *The Botanical Magazine* is entered under Curtis, not under Hooker; the initials of authors are omitted; and some of the entries might be advantageously condensed—*e.g.* the nine lines under "Brown" might usefully be condensed into four. The notices are often so very brief that the appending of the name of the writer seems unnecessary; and there is a want of uniformity in the citation of names, which are sometimes spelt out with a rather pedantic accuracy—"Hiern, W[illiam] P[hilip]"—and at others abbreviated—"Brown, N. E." We should have thought it unnecessary to notice reprints and abstracts separately.

The *Daily News* of Dec. 30 has an article boasting four headings, one of which is "Reminiscences of Darwin." The work and life of the great naturalist are so well known that it is difficult

to find anything new to record; we make no apology, therefore, for transferring these "reminiscences" to our pages, confident that they will be as new to our readers as they were to ourselves. The story, it must be owned, bears a curious resemblance to the well-known anecdote about *Angræcum sesquipedale*, and it is not easy to imagine a "deeply recessed" tulip with a "long floral tube." Perhaps, should this reach his eye, the writer will, when next visiting the Entomological Department of the British Museum, with which he is evidently well acquainted, bring a specimen to the Botanical Department, where it will be welcomed as a novelty. The paragraph runs as follows:—

"Who that knew of Charles Darwin's constant visits to the collection, when it was so inadequately housed at Bloomsbury, will ever forget the enthusiasm with which he studied the specimens? 'If the truth of evolution is proved anywhere,' he was wont to exclaim, 'it is proved in the insect room. This will be the battle-ground of the future. Nowhere else do you get such a complete chain of links.' One day, famous in the annals of science, the great man arrived with a problem to solve. He had found a tulip so deeply recessed that he was at a loss to determine how fertilisation could be effected. There was no record of any moth having a proboscis of anything like the length necessary for the purpose. However, there might be one; so, with the remark that 'it must be at least 9½ inches long,' he set himself, with one of the officials, to unravel the probosces of likely insects. A great triumph! —at last one of the sphinges was found in the possession of a suctorical [*sic*] organ of precisely the length desired. Moreover, if my memory serves, the insect was tabulated as coming from the very locality where the tulip had been found. At any rate, the facts tallied so precisely that Darwin deemed the matter proved. But, alas! for the shortcomings of human reason. It has since been ascertained that the fertilisation of that particular tulip is effected by a certain bee, which, when it has a difficulty in crawling down the long floral tube, bites its way in at the base."

Our attention has been called to a paper by Mr. Roland M. Harper published in *Torreya* for March last, in which the conclusions as to the nomenclature of *Lachnanthes*, printed in this Journal for January, were forestalled. It it unnecessary to say that we were not aware of the anticipation when we published the paper, in which, by the way, a misprint occurs: p. 24, line 8 from bottom, should run: "*Camderia* Dumort. Anal. Fam. Pl. 80 (1829)."

The first number of Mr. Tansley's new botanical journal, *The New Phytologist*, which we announced last year (p. 356), made its appearance on Jan. 23. It contains twenty-four pages, without illustrations, and costs 1s. 6d.; subscribers, however, will receive the ten numbers forming the year's issue for 10s. The principal contribution is the first part of a revision of the classification of the Green Algæ, by Messrs. F. F. Blackman and A. G. Tansley.

Dr. Rendle's monograph of the *Naiadaceæ*, a recent instalment of *Das Pflanzenreich*, brings into a convenient form his researches

into the single genus of which the order is composed. We are glad to find an English botanist taking part in this important work. The last part of *Das Pflanzenreich*, issued on Jan. 7, contains the *Aceraceæ* by Dr. F. Pax; 114 species are described, many of which are new.

In the interests of posterity we venture to suggest the desirability of appending signatures to those articles in the *Gardeners' Chronicle* in which new forms are described. In the number for Jan. 4 a new variety of *Helichrysum* is described and figured, which, we are told, "may be called *H. Gulielmi* var. *Meyeri*," But there is no means of identifying "we"; and, if the editor is intended, his name is alike absent from either the wrappers of the numbers or the title-pages of the volumes. We note that in the new *Botanisches Centralblatt* Mr. Massee occasionally lifts the veil of anonymity which so often shrouds the contributors to the Kew *Bulletin*, but we can but think that general convenience would be served by appending an author's name to every paper in which new forms are established.

Mr. Philip Cochrane asks us to insert the following particulars regarding a "Garden of British Plants" which he has established at Catford:—"The garden can be reached from London by the Catford or Catford Bridge stations of the South Eastern and Chatham Railway, thence by omnibus (or about fifteen minutes' walk) to Castlands Road, Perry Hill, in which it is situated. I commenced laying it out in March, 1899, and have prepared suitable habitats by forming pools; rockeries and rooteries [*sic*]; a peat, and a clay fresh-water marsh; a sand, and a clay salt-marsh; peat, chalk, and sand mounds; beds and borders; rustic arches, &c. It now contains fully 700 species, labelled first with their English names, and then the Latin name and the natural order, thus affording a source of instruction and recreation to all who can avail themselves of it. But this collection cannot be completed and maintained without the assistance of a certain number of subscribers of a small sum, namely, 5s. annually. In response to an appeal which has lately been made for 100 annual subscribers, 73 subscriptions of 5s. have been sent or promised, and the remainder are urgently needed to ensure the success of the project, and to prevent all the money and labour I have spent upon it from being wasted. The above-named subscriptions (amounting to £25) are only sufficient for necessary expenses; my own time has been, and will continue to be, freely given. I shall usually be at the garden on week-days from 2 p.m. till dusk, and from 3 p.m. on Sundays, and will give subscribers all information they may require. They can be supplied with a key (at a cost of 6d.), so that admission may be obtained at any time for themselves and friends. Students of botany can be supplied with specimens at 6d. per dozen. Any subscriptions which may be sent to me at 13, Marlowe Road, Anerley, S.E., will be thankfully acknowledged."

We regret to announce the death of Mr. Alfred W. Bennett, which took place suddenly on Jan. 23rd.

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☞ *Plate 430, illustrating articles in February number, is issued in this, having been unavoidably delayed.*

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The Journal of Botany was established in 1863 by Dr. Seemann. In 1872 the editorship was assumed by the late Dr. Trimen, who, assisted during part of the time by Mr. J. G. Baker and Mr. Spencer Moore, carried it on until the end of 1879, when he left England for Ceylon. Since then it has been in the hands of the present Editor.

Without professing to occupy the vast field of general Botany, the Journal has from its inception filled a position which, even now, is covered by no other periodical. It affords a ready and prompt medium for the publication of new discoveries, and appears regularly and punctually on the 1st of each month. While more especially concerned with systematic botany, observations of every kind are welcomed. Especial prominence has from the first been given to British botany, and it may safely be said that nothing of primary importance bearing upon this subject has remained unnoticed.

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FIGS. 1–11. Octodiceras Julianum *Brid.*

„ 12–19. Tetraplodon Wormskioldii *Lindb.*

Cotyledon undulata Haworth.

Cotyledon crassifolia Haworth.

Cotyledon canalifolia Haworth

Cotyledon tricuspidata Haworth.

Cotyledon rotundifolia Haworth.

SOME SOUTH AFRICAN SPECIES OF COTYLEDON.

By S. Schönland, M.A., Ph.D., F.L.S., & Edmund G. Baker, F.L.S.

(Plates 431–435.)

(Concluded from p. 23.)

The following notes are from a plant which has been doubtfully referred to *C. tomentosa* Harvey, collected by R. Schlechter on hills, alt. 1700 ft. at Vuurdood, Western Region, no. 11443, 28. ix. 1897. We are unable to express an opinion on the suggested identification till we have examined authentic material of Harvey's species. Peduncle erect, branching, pubescent. Flowers in a corymbose cyme—pedicels pubescent, 3–6 mm. long. Calyx-lobes oblong, subacute, pubescent, ciliate, ± 6 mm. long. Corolla-tube about 9 mm. long, lobes oblong, acute, ciliate, pinnately veined, ± 6 mm. long. Carpels glabrous, gradually narrowing to slender style, 8–9 mm. long. Squamæ emarginate at apex, rather over 1 mm. long. The leaves are absent.

C. fascicularis Ait. Hort. Kew. ii. p. 106 (1789). Recent gatherings of this plant are:—Herb. Austro-Afric., no. 1456. In lapidosis carroideis prope Ashton in ditione Worcester, alt. 800 ft. In collibus aridis prope Brand Vley. *R. Schlechter*, no. 9931, alt. 1200 ft., 9. 1. 1896.

The following notes are from a living specimen. Flowers not always pendulous, minutely papillose. Corolla dull red with green pencilling, and with broad pale green bands narrowing upwards along the sutures of the corolla-tube. Corolla-tube straight, pentagonal in transverse section. Calyx-lobes thick, convex on back, dull red passing into pale green below. Squamæ pale greenish yellow, laterally free. Length of open flower 22 mm., length of calyx 10 mm., length of calyx-lobes 7 mm., length of corolla-tube 18 mm., length of corolla-lobes 18 mm. Breadth of squamæ 3 mm., length of squamæ 2 mm.

This plant is the *C. frutescens, folio oblongo*, &c., of Burman, Dec. tab. 18 (1738), and is therefore *C. spuria* Linn. in part, as this is one of the figures quoted for this species.

Burman's figure is also interesting in another connection. Linn. f. (Suppl. p. 242 (1781)) diagnoses his *C. paniculata* as follows:—"Cotyledon fruticosa foliis oblongo-ovatis sessilibus, panicula divaricata racemosa." It was collected at the Cape by Thunberg. Thunberg (Fl. Cap. 396) gives a more lengthy description of what is obviously the same plant, referring to it Burman's figure. If *C. paniculata* Linn. fil. and *C. fascicularis* be the same species, then the former takes precedence of publication by several years.

C. Eckloniana Harv. Fl. Cap. ii. p. 317. In Harvey's herbarium there is a plant which has been doubtfully referred to this species from Rev. H. Whitehead, Namaqualand. It agrees with Harvey's description. It is quite distinct from *C. fascicularis* Ait., and is closely related to *C. Wallichii* Harv., but in this latter plant the

peduncles, panicle, calyx, and corolla are as stated, more or less viscoso-pubescent.

C. Wallichii Harvey, *l. c.* There is a type of this plant in Harvey's herbarium from Wallich, Elandsberg. *T. Cooper*, no. 1586, District of Uitenhage; *A. Rehmann*, no. 2825, Hex River Valley; and *H. Bolus*, no. 5160, in carroideis in valle flum. Hex River, are the same.

C. gracilis Haw. Suppl. 1819, p. 26. Harvey (Fl. Cap. ii. p. 373) describes a *C. gracilis*, but many years earlier Haworth described a species bearing the same name, to which Harvey makes no reference. Haworth's description runs:—

"C. (slender) foliis lanceolato-linearibus carnosis caule florifero terminali, laxe subpaniculato, 3–5-floro, debiliter decumbente, folioso; calycibus pentaphyllis, foliolis sublanceolato-acuminatis brevissime ramentaceo-subciliatis, corolla triplo brevioribus. Floret æstate.

"Ex Lutetia, a Dom. Williams, accepit Dom. Colvill, circa annum 1800, quoque mecum florentem communicavit; at olim credidi varietatem Cot. spuriæ; at magis affinis C. purpureæ; sed differt foliis omnino angustioribus acutioribus, et potissimum in foliolis calycinis lineari-acuminatis obsolete ramentaceo-subciliatis. Folia 3–4-uncialia, latitudine subtrilinearia. Caulis floriferus fere pedalis decumbens, bracteis numerosis alternis erectis foliiformibus; superioribus sensim sensimque minoribus at supremis 3–4-linearibus; et lente parce ramentaceo-pilosulis, uti pedunculi filiformes sesquiunciales calycesque. Corolla 5-fida laciniis tubo triplo solum brevioribus.

"Obs.—Caulis floriferus quasi albidus; et angulatus e decursione laterum foliorum. Exemplum bene siccatum solum possideo, a quo descriptionem elaboravi."

There is no specimen in Haworth's herbarium, and we are not able at present to determine the position of the species.

C. ventricosa Burm. Prodr. p. 13 (1768). This species is widely spread in carroid districts, and is in cultivation in Dr. Schönland's garden, Grahamstown. When eaten by goats, it is supposed to produce a nervous disorder known as "Nenta." This supposition seems to be confirmed by experiments carried out by Veterinary Surgeon Borthwick.

Var. *β* alpina Harv. Fl. Cap, ii. p. 376. A type of this variety is in Harvey's herbarium—the peduncle is not straight, as in Burman's figure of the type, but somewhat zigzag. Squamæ longer than broad—2 mm. long, 1 mm. broad.

Hab. Elandsberg, *Dr. Wallich.*

C. reticulata Thunberg, Prod. Fl. Cap. i. p. 83 (1794). There is a specimen from Masson in Herb. Mus. Brit. "Herb. Austro-Africanum, no. 1861. In campis carroideis prope pagum Matjesfontein, legit *MacOwan*."

C. ? dichotoma Haworth, Suppl. Pl. Succ. p. 27 (1819), is apparently synonymous with the above; also *C. parvula* Burchell, Travels, i. p. 219 (1822), of which there are specimens from Burchell in Herb. Kew. The following is Burchell's diagnosis:—

"Planta 6–9-pollicaris, erecta. Folia crassa ovalia compressiuscula. Panicula dichotome ramosa. Pedunculi erecti longissimi capillares."

Sect. II. Spicatæ.

C. trigyna Burchell, Travels, ii. p. 226 (1824). The following is Burchell's diagnosis:—"Acaulis. Folia glabra complanata carnosa cuneato ovalia (vel suborbicularia). Flores erecti alterni, in scapo elongato simplici (rarissime bifido). Corolla cylindrica purpurascens, limbo albo brevi reflexo. Faux purpurea. Capsulæ tres."

There are specimens from Burchell in Herb. Kew, from which the following description is taken:—Calyx-lobes lanceolate subacuminate, ± 2 mm. long. Corolla tubular much longer; the calyx ± 1·3 cm. long; lobes reflexed or subreflexed, about 2 mm. long, acute. We have only had an opportunity of dissecting a single flower of the type of this species, but find five carpels. Squamæ longer than broad. [Reductions in the number of carpels are sometimes found in Crassulas which have normally five. I have never seen it in Cotyledon.—S. S.]

C. triflora Thunberg, Prod. Fl. Cap. p. 83 (1794). There is a plant in the Oxford Herbarium from Prince Salm Dyck bearing this name, which agrees exactly with Thunberg's short diagnosis. It has been placed under *C. hemisphærica*, but, judging from the original description, the leaves seem to be much larger than in the type of the latter.

Confer Haworth, Rev. Pl. Succ. p. 19. For a description of this plant see also Salm Dyck, Obs. p. 6 (1820).

C. rotundifolia Haworth in Phil. Mag. 1827, p. 273. Probably not specifically distinct from *C. hemisphærica* L.; the leaves are broader, branches less erect, and the caudex thicker. There is a specimen in the Oxford Herbarium, which may be described as follows:—Leaves subrotund, apex rounded, margin sometimes somewhat undulate, 2·5–3·5 cm. long, 2–2·5 cm. broad, glabrous. Flowers subsessile, solitary or rarely in twos, patent or erecto-patent, spicato-racemose. Calyx-lobes deltoid, short, about 1 mm. long. Corolla tubular, tube ± 1·1 cm. long, lobes ovate, subacuminate, finally reflexed or subreflexed.

C. Zeyheri Harvey, Fl. Capensis, ii. p. 377 (1861–1862). There are specimens of this plant in the Albany Museum from Graaff Reinet, *Geo. Rattray*, and rocky places near Grahamstown, *S. Schönland*, no. 709. These have been compared with *Zeyher*, no. 2571, the type of *C. Zeyheri* Harvey; and also with the type of *C. cristata* Haworth (Phil. Mag. 1827, 274), and we think that these species should be united. The key to these plants in Harvey's *Flora Capensis* is somewhat misleading, as the leaves of *C. cristata* are there described as glabrous, which is incorrect. Haworth's is the earliest name.

C. Cooperi Baker in Refugium Botanicum, tab. 72 (1869). This species was discovered on the Zuurberg Range by *Thos. Cooper*. It may only be a variety of *C. maculata* Salm Dyck.

Var. IMMACULATA var. nov. Caulis brevis crassus. Folia ut in typi sed haud maculata. Scapus glaucus, 12–30-florus. Calycis lobi lanceolato-acuminati.

Hab. Graaff Reinet, *G. Rattray*. In flower, Nov. 1897; flowered at Grahamstown, Jan. 1900 and 1901.

Root fibrous. Stem short, thick. Leaves 5·0–7·0 cm. long, 2·5–3·4 cm. broad at broadest point just below the apex. Calyx-lobes just over 1 mm. long. Corolla-tube ± 1 cm. long; lobes 4 mm. long.

C. CLAVIFOLIA Haworth in Phil. Mag. 1827, p. 274. There are no specimens in the Oxford Herbarium. It is considered by Harvey as a doubtful synonym of *C. cristata*, but Haworth considered it distinct, although closely allied, and in this opinion we concur. There is a good water-colour drawing of this plant in the Kew collection. The following is the original diagnosis and description:—"C. (club-leaved bramy) foliis petiolatis claviformibus incurvantibus, apice subcrispo acuminulato. Florebat cum præcedente in Sept. 1826, G. H. Descriptio. Priori valde affinis at abunde distincta videtur. Folia subtrientalia, plus quam duplo angustiora, petiolo magis incurvo, vix puberula, ramentis caulinis forte paucioribus; cum eodem modo florendi; tubo subincurvo robustiore, viridi; laciniis intus albis, extus (uno latere) purpureis, et basi undato-sublobulatis ut in priore."

In shape of leaf it is more nearly allied to *C. Cooperi*.

C. RHOMBIFOLIA Haworth in Phil. Mag. 1825, p. 33; Refugium Botanicum, tab. 36 (1868). There are no specimens in the Oxford Herbarium. The plant figured in the *Refugium* differs from its near allies (*C. hemisphærica* Linn., *C. maculata* Salm Dyck, and *C. rotundifolia* Haworth) in its obovate spathulate leaves, which are longer in proportion to their breadth than the others. The raceme is either simple or forked. It flowered at Grahamstown in the spring of 1898.

C. MACULATA Salm Dyck, Obs. p. 5 (1820). *C. alternans* Haworth, Suppl. Pl. Succ. p. 26, ex Salm Dyck, *l.c.*, non Willd. There is a specimen named *C. maculatum* by Haworth in the Oxford Herbarium, and a water-colour drawing in Herb. Kew.

Salm Dyck's diagnosis is as follows:—"C. suffrutescens, foliis ovato-spathulatis basi subauriculatis, carnosis, nitidis, utrinque maculis atro-rubentibus notatis. Floribus spicatis subalternis."

The following notes are from Haworth's specimen:—Leaves few, obovate or obcordate emarginate, apex obtuse with a short acumen, margin cartilaginous sometimes undulate, base cuneate, 4·2–4·5 cm. long, 2·3–3·3 cm. broad at the broadest point, which is about one-fourth of the total length from the apex. Flowers sessile, solitary, numerous, erecto-patent, alternate, arranged in a lax spike. Peduncle terminal, terete, of a purplish colour. Calyx-lobes short (about 1 mm. long). Corolla tubular somewhat ventricose above the calyx, ± 8 mm. long; lobes erect or erecto-patent, ± 3 mm. long, acute.

The flowers, as stated, are solitary, while those of the plant

figured in the *Refugium*, tab. 35, are often geminate; this figure may represent a spotted variety of *C. rhombifolia* Haw.

C. NANA N. E. Brown in Gard. Chron. 3rd Series, XXX. 270 (1901). This is stated to be nearly related to *C. hemisphærica*. The peduncle is terminal and one-flowered.

C. Alstoni, sp. nov. Suffrutex. Caulis brevissimus. Folia opposita sparsa erecta vel suberecta crassa oblanceolata vel anguste obovata apice rotundata vel submucronata utrinque subplana maculata, cr. 3–4 mm. crassa, 4·0–7·0 cm. longa, 2·0–2·3 cm. lata. Scapus erectus glaucus 12–35-florus simplex, 25–35 cm. longus. Flores erecto-patentes ut in affinibus subsessiles vel sessiles vel solitarii vel geminati vel ternatim dispositi. Bracteæ ad basin florum minutæ acutæ ± 1 mm. longæ. Calycis lobi lanceolati acuminati 1–1·25 mm. longi. Corollæ tubus 1·2–1·3 cm. longus cylindraceus quam calyx 6–7-plo longior lobi reflexi et tubo retroadpressi deltoideo-acuminati vix 2 mm. longi. Filamenta longiora corollæ tubum superantia et ut corollæ lobi demum reflexa. Squamæ longiores quam latæ apice subemarginatæ.

Hab. Namaqualand, *G. Alston*. Flowered in Dr. Schönland's garden, Grahamstown, Jan. 1901.

The leaves when received were a pale dull red, and remain so when grown in the open, but in the shade they become greenish and speckled. Flowers shortly pedicellate in a spiciform raceme. Corolla-tube quite cylindrical, lobes reflexed and edges bent over, deltoid acuminate, hardly 2 mm. long. Long stamens exceeding the corolla-tube, also reflexing a day or two after the flower has opened. Flowers green tinged with red outside and inside, except reflexed petals pale pink.

C. CARYOPHYLLACEA Burm. Prod. Fl. Cap. p. 13 (1768). This plant was figured by Burman in his *Decades*, t. 17, and we agree with Mr. Bolus in considering this identical with a plant collected by him "in fissuris rupium in monte Tandjesberg prope Graaff Reinet, no. 758." The only noticeable discrepancy is that the pedicels are much thicker in the plant than in the drawing. The plant is stated by Mr. Bolus to be very rare, and it is an interesting rediscovery of one of the older species. There can be little doubt that it is *C. jasminiflora* Salm Dyck, of which we give a description drawn up from authentic material, and of which there are specimens in the Oxford Herbarium from Salm Dyck and Haworth:—Stem rather thick, branching, ± 6·0 cm. long, suffrutescent. Leaves fleshy, oblanceolate or oblong spathulate, green, shining, 1·3–3·0 cm. long, and ·9–1·3 cm. broad at broadest, obtuse. Scape 13–15 cm. long, 4–6-flowered. Pedicels sometimes rather short, thickened obclavate, 3–5 mm., sometimes scape branches, and branches in one case reach 5·5 cm. long, ascending. "Flowers erect, with a green tube and a revolute purple and white limb." Calyx-lobes triangular acute, 1·5 mm. long. Corolla-tube ± 1·4 cm. long, lobes ovate acute, nearly 5 mm. long. Stamens included. Squamæ longer than broad.

The alliance of this plant is with *C. hemisphærica* in the

structure of the flowers, although the character of the inflorescence in Sect. II. *Spicatæ* would have to be somewhat modified to admit of its being placed there.

Explanation of Plates.

431. *Cotyledon undulata* Haworth.
432. ,, *crassifolia* Haworth.
433. ,, *coruscans* Haworth (= *C. canalifolia* Haworth).
434. ,, *tricuspidata* Haworth.
435. ,, *rotundifolia* Haworth.

From photographs of Haworth's types preserved in the University Herbarium, Oxford. All about half natural size; the exact dimensions ascertainable from the centimetre scale photographed with each.

NORFOLK NOTES.

By C. E. Salmon, F.L.S., and Arthur Bennett, F.L.S.

In July, 1900, we spent a fortnight in Norfolk, accompanied by Mr. Bennett. We saw a good many of the rarer "Broad" plants, but not *Senecio palustris*, which the marshman told us had been "carried away in a hamper" two years before. It was annoying to hear this, as it had been rooted up from the same place some years ago. I hope the next man who attempts it will get the "accidental ducking" we suggested to the man!

Some of these notes are given because they are in books not easily accessible. With what has appeared in this Journal, and in the Transactions of the Norfolk and Norwich Naturalists' Society, they contain nearly all that has been published since the appearance of Trimmer's Supplement to his Norfolk Flora in 1885. Some of the notes are taken from a list of plants mentioned in Smith's *English Flora*, and compared with Smith's herbarium at the Linnean Society in July, 1867; others are from a list of Norfolk plants in the Herbarium of the British Museum. These lists were compiled by Mr. H. G. Glasspoole, and given by him to A. Bennett.

Norfolk has the misfortune to be divided for botanical purposes in three different ways. The Rev. G. Munford, in White's *History and Directory of the County* (ed. 3, 1864), makes four divisions—W., N.C., S.E., and E. Mr. Watson divides it into east and west by the 1° of longitude E. of Greenwich; and the Rev. K. Trimmer, in his Supplement to his Norfolk Flora, by a line drawn from the "Meals" at Stiffkey, through East Dereham and East Harling, to where the Little Ouse separates Blo' Norton from Suffolk; this is almost the same as Mr. Watson's, the two supposed lines being only about two miles apart. In any future Flora of the County, all these divisions will have to be ignored, and some more natural ones found.

The sign * indicates an addition to the county flora; † denotes an alien. The numbers 27, 28, indicate respectively Watson's sub-provinces of East and West Norfolk; where no number is given,

27 is meant. The *Characeæ* have been seen by the Messrs. Groves.

Thalictrum minus L. 28. Plantation at Croxton, on the Mundford Road; E. Forster's herb. in *Herb. Brit. Mus.*

Myosurus minimus L. Roydon ?‡: *Herb. Brit. Mus.* Furrows of St. Faith's Fair-stand, 1779; *Herb. Smith.*

Ranunculus Lingua L. By Stalham Dike; A. B.

R. confusus (Godr.). 28. Wolferton; G. C. Druce in *Record Club Report*, 1884–6, p. 115.

Papaver hybridum L. Half a mile out of St. Benedict's Gate, Norwich, 1779; Mr. Pitchford in *Herb. Brit. Mus.*

Rœmeria hybrida DC. 28. Swaffham; Dr. Jermyn, *Herb. Brit. Mus.* In the *Phytologist*, v. 255, 291, N.S. (1861), Mr. W. Winter states that this plant grows in some fields not far from Castle Acre Priory, near Swaffham; also at Little Cressingham, and at Fritton, two miles from Long Stratton. This botanist's records have not been accepted without doubt, still the plant would be worth a search, as it has not been gathered in Cambridgeshire for the last few years. He says it flowers in June, and grows on gravelly hills.

Fumaria parviflora Lam. 28. Near Lynn; B. Bray, *Record Club Report*, 1881–2, p. 184.

Arabis perfoliata Lam. Roadside-bank between Horstead and Frettenham, plentiful; C. E. S. 28. Hedge-bank near Harling Station! *Herb. R. Barrington.* Thompson's Grove, Thorpe, 1779; *Herb. Brit. Mus.*

Sisymbrium officinale Scop. var. **leiocarpum* DC. Palling.

S. Sophia L. By Martham Staithe; A. B. By field between Horstead and Frettenham; C. E. S. East Runton; C. Bailey, *Record Club Report*, 1874, p. 52. Roadside between Ingham and Palling.

Erysimum cheiranthoides L. Field near Sutton Church.

†*Saponaria officinalis* L. Hedge by the Bungay Road at Haddisco, and under a wall at the entrance to Lower Sheringham; D. Turner in *Bot. Guide*, p. 431.

†*Silene dichotoma* Ehrh. Field between Stalham Green and Ingham.

S. anglica L. Mundesley; A. B. Palling.

S. conica L. Cliffs beyond Cromer!; C. Bailey, *Record Club Report*, 1874, p. 54.

Stellaria aquatica Scop. By Bure near Lamas, and also between Little Hautbois and Coltishall; C. E. S.

S. palustris Retz. By Stalham Dike; A. B. Marsh near Whitesley; Flegg Burgh Fen.

Sagina nodosa Fenzl. Near Lambs Holes, Newton; C. E. S. Bank of stream from Martham Broad; marsh near Whitesley; near Thurne.

S. apetala L. Ormsby; Druce, *Record Club Report*, 1883, p. 33. 28. Near Swaffham; B. Bray, *Record Club Report*, 1880, p. 132.

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‡ There are two Roydons in Norfolk, one in West, one in East.

Spergularia marginata Syme. 28. Holme; G. C. Druce in *Record Club Report*, 1884–6, p. 117.

Holosteum umbellatum L. Walls near the Close, Norwich, 1801. Norwich walls near Magdalen Gate, 1779; *Herb. Brit. Mus.*

Spergula arvensis L. *var. *vulgaris* (Boenn.). Field near Frettenham Church; C. E. S. Cultivated field near Palling. — *Var. *sativa* (Boenn.). Field near Frettenham Church; C. E. S.

Montia fontana L. *var. *erecta* Pers. Newton Common; C. E. S.

Medicago falcata L. (var. fl. purp.). Yarmouth Denes; Wigg in *Bot. Guide*, p. 441.

M. sylvestris Fr. Lakenham, 1783; *Herb. Brit. Mus.*

†*Melilotus alba* Desr. 28. Among lucerne at Hilgay; Miss Bell in *Cyb. Brit.* 1847, p. 289.

Trifolium squamosum L. Thorpe, 1779; Mr. Crowe in *Herb. Brit. Mus.*

Onobrychis viciæfolia Scop. Fields between Cromer and Runton; C. Bailey in *Bot. Exch. Club Rep.* 1891.

Vicia lathyroides L. Yarmouth; D. Turner, *Herb. Brit. Mus.*

Lathyrus Aphaca L. Forncet; Mr. Fox in *Herb. Brit. Mus.*

L. palustris L. Ormsby Broad; H. G. Glasspoole!

Geum rivale L. 28. Woolverton Wood (Martyn). Fincham (Rev. R. Forby); *Bot. Guide*, p. 433.

Potentilla argentea L. Between Buxton and Little Hautbois Hall; C. E. S.

P. palustris Scop. Flegg Burgh Fen; A. B. Near Lambs Holes, Newton; C. E. S. Marsh near Whitesley.

Agrimonia odorata Mill. Near Lambs Holes, Newton; C. E. S.

Pyrus Malus L. var. *acerba* DC. Lane south of Stalham Green, towards marshes.

Parnassia palustris L. Near Lambs Holes, Newton; C. E. S. Bank of Stalham Dike; near Thurne. 28. Ashill, 1799; *Herb. Smith.*

Tillæa muscosa L. Yarmouth Denes, especially about the Whales Jaw Bones; Wigg in *Bot. Guide*, p. 424. 28. South gravel walk at Holkham, 1822; *Herb. Smith.*

Cicuta virosa L. By Stalham Dike; A. B. By Rollesby Broad.

Carum segetum Benth. & Hook. fil. Hedge adjoining a public-house at Acle, by the Dam; Wigg in *Bot. Guide*, p. 428.

Sium latifolium L. By Stalham Dike. Flegg Burgh Fen; A. B.

Œnanthe fistulosa L. Newton Common; C. E. S. Marsh near Whitesley; Flegg Burgh Fen; near Ormesby Bridge.

Œ. Phellandrium Lam. Near Filby Bridge. 28. Lynn; B. D. Wardale, 1844, in *Herb. Brit. Mus.*

Peucedanum palustre Moench. Flegg Burgh Fen; A. B. Near Belaugh and Bridge Broads; C. E. S. By River Bure, near mouth of Aut; near Martham Broad; marsh near Whitesley; near Blackfleet Broad; by Rollesby Broad; near Thurne.

Adoxa Moschatellina L. In a close lane near Lakenham Church, 1780; *Herb. Smith.*

Galium erectum Huds. Bank near Station at Coltishall; C. E. S.

G. anglicum Huds. 28. Castle Acre ruins; K. Trimmer, 1836, *Herb. J. A. Power* in Holmesdale Nat. Hist. Club Museum, Reigate.

Valerianella rimosa Bast. Cornfield between Fellbrigg Green and Cromer; C. Bailey in *Bot. Exch. Club Rep.* 1891.

†*Erigeron canadense* L. Near Norwich. Field near Coltishall Station; C. E. S. Stalham, near Staithe.

Filago spathulata Presl. Field near Little Hautbois! Miss M. C. Taylor. Plentiful, with *germanica*, in field near Frettenham Church; C. E. S.

Inula Helenium L. Meadow at Boughton, near Stoke; Rev. R. Forby in *Bot. Guide*, p. 443.

Artemisia vulgaris L., var. Roadside bank between Stalham Green and Ingham. A very peculiar form with dense reddish inflorescence, forming a compact spike.

Cnicus pratensis Willd. By River Bure, near mouth of Ant; near Thurne.

Hieracium umbellatum L. By field-path near Hainford; C.E.S. Roadside between Ingham and Stalham.

"*Leontodon palustre.* Ellingham Fen (Woodward). Lower Common at Heydon (Rev. H. Bryant)"; *Bot. Guide*, p. 442.

Pyrola rotundifolia L. Near Blackfleet Broad. First discovered here by Mr. T. A. Cotton, circa 1890. Though a rare species in Norfolk, it still grows in three or four localities, but nowhere in such abundance as in this station.

†"*Lysimachia punctata* L. 28. Hingham!"; Bab. *Man.* ed. 8, p. 291 (1881).

[*Statice rariflora* Drej. In Top. Bot. West Norfolk is given for this, and in Trimmer's Supplement East Norfolk also; with the Flora eleven stations are given for this plant, and Prof. Babington records "all four species at Cley." Mr. Geldart tells me that the specimen in Prof. Babington's herbarium at Cambridge is only a form of *Limonium*, and he knows no certain specimen of *rariflora* for the county. In Suffolk, in 1901, I saw thousands of *Limonium*, varying from the ordinary form to the var. *pyramidalis*, at Thorpe and Aldborough, but no *rariflora*; A. B.]

[*Myosotis repens* Don. This is not certainly known for either Norfolk or Suffolk, but occurs in Cambridgeshire—"Baitsbite. J. A. Power" (in Herb. Holmesdale Nat. Hist. Club)—though unrecorded by Babington in his Flora.]

Volvulus Soldanella Jung. 28. Hunstanton; H. Baber, *Herb. Brit. Mus.*

Hyoscyamus niger L. var. *pallidus.* 28. Smith (Engl. Fl. i. 316) mentions a variety with veinless flowers found at Fincham by the Rev. R. Forby; this Syme (Engl. Bot. ed. 3, vi. 106) identifies with *H. pallidus* Kit.

Verbascum thapso-nigrum Schiede. 28. "Found by Mr. Dawson Turner at Barton, near Swaffham"; Syme, *Engl. Bot.* ed. 3, vi. 118.

V. nigro-pulverulentum Sm. 28. Beechamwell; D. Turner in *Bot. Guide*, p. 426.

V. nigro-lychnitis Schiede. Near Yarmouth; D. Turner in With. *Arr.* ed. 6, iii. 840 (1810).

[*Veronica spicata* L. The record in Top. Bot. p. 287, "28. Norfolk, W. Wardale," must be expunged, as Wardale's specimen in Herb. Brit. Mus. is rightly identified by Watson with *V. officinalis*.]

V. triphyllos L. 28. Great Wretham; *Herb. Brit. Mus.* This is about six miles north-east of Thetford.

Orobanche purpurea Jacq. West Runton Churchyard; H. D. Geldart. Overstrand; H. T. Mennell, 1888. No doubt sporadic, but I saw it in one place only in 1900; A. B.

Utricularia intermedia Hayne. The note of doubt to West Norfolk under this (Top. Bot. p. 333) can be expunged, as, although Mr. Watson thought it might apply to *neglecta*, there is another locality in Trimmer's Supplement for West Norfolk. In East Norfolk it was found by the Rev. C. Davie at Thurne, and by the Messrs. Groves near Stalham, &c. (Journ. Bot. 1893, 374).

Calamintha officinalis Moench. Near Walsingham; *Herb. R. Barrington*. Roadside between Martham Church and Staithe; A. B. — *Var. *Briggsii* Syme. Roadside bank near Wroxham. This is a wide extension of its hitherto recorded range; stations in Somerset, Devon, Cornwall, and Guernsey being previously only given for this plant; C. E. S.

*†*Melissa officinalis* L. By roadside, Coltishall; C. E. S.

Scleranthus perennis L. Top. Bot. p. 173. The doubt as to East Norfolk can be expunged, as one of the localities recorded by Trimmer in his Supplement is in East Norfolk.

Atriplex pedunculata L. Banks of Breydon, 1802; E. Forster in *Herb. Brit. Mus.* This is near Yarmouth.

Chenopodium rubrum L. var. *pseudo-botryoides* Wats. 28. Hunstanton; Syme's *Eng. Bot.* ed. 3.—Var. *glomeratum* Wallr. Marsh at Holme-next-the-Sea; E. M. Holmes!

C. Bonus-Henricus L. Near Buxton Church; C. E. S.

Rumex maritimus L. Bank of Bure near Wroxham Broad; C. E. S. By Stalham Dike; near New Cut between Ingham and Palling.

R. limosus Thuill. Bank of Bure near Wroxham Broad, and near Wroxham Staithe; C. E. S. Bank of Stalham Dike.

R. pulcher L. Near Buxton Church, and between Buxton and Little Hautbois Hall. Common about Coltishall; C. E. S.

Daphne Mezereum L. On a bushy hillock in a marshy spot near Thurne, bearing good fruit.‡ In Trimmer's *Flora of Norfolk* (1876) only one station is given for this plant, and, as far as we can ascertain, no other station has since been recorded. It was shaded by low bushes in one small clump. Perhaps bird-sown, though the spot is very wild.

Betula verrucosa Ehrh. and *B. glutinosa* Fr. Copse, Sprowston; E. F. Linton in *Record Club Report*, 1881–2, p. 195.

Viscum album L. Mr. Trimmer (Suppl.) says that the owner of Arminghall Hall showed him the plant on various trees. "Hawthorn trees at Arminghall, 1779"; *Herb. Smith.*

Mercurialis annua L. Near Stalham.

‡ *I. e.* in E. Norfolk.

Liparis Loeselii Rich. We saw this in a swampy place near Thurne, where it was discovered by the Rev. C. Davie about 1887. We also saw it near Ranworth. It still grows in the counties of Norfolk, Suffolk, and Cambridge, but is probably extinct in Hunts, where it was gathered by the Rev. W. T. Bree in 1841!

Epipactis palustris Crantz. Near Lambs Holes, Newton; C. E. S. Marsh near Whitesley; near Blackfleet Broad; near Thurne.

Orchis latifolia L. Marsh near Whitesley.

Habenaria conopsea Benth. and *H. bifolia* R. R. Near Ranworth Broad.

Allium vineale L. var. *bulbiferum* Syme. Roadside bank near Ingham.

Juncus Gerardi Lois. 28. Hunstanton; T. B. Blow in *Record Club Report*, 1877, p. 224. Trimmer (Flora, p. 147; Suppl. p. 59) gives only *J. compressus* Jacq. Nearly all the stations given by him are probably referable to *Gerardi*; I have only seen *compressus* in one place; A. B.

J. compressus Jacq. Marsh near Whitesley.

Sparganium simplex Huds. Near Filby Bridge.

Alisma ranunculoides L. Near Bure, near Little Hautbois; C. E. S. Marsh near Whitesley; Flegg Burgh Fen; by Ormesby Bridge.

Triglochin palustre L. Near Bure, near Little Hautbois. Near Lambs Holes, Newton; C. E. S. Marsh near Whitesley.

Potamogeton polygonifolius Pourr. Ditch near Sutton Church; A. B.

P. coloratus Hornem. Hickling; T. A. Cotton!

P. alpinus Balb. Dyke near Belaugh Broad; C. E. S. 28. Norfolk West; Hind, sp. This occurs near Brandon, on the Norfolk side.

P. lucens L. Abundant in the Bure from Thurne Mouth to Ranworth; Womack Broad; abundant in the New Cut at Palling Bridge.

P. prælongus Wulf. Abundant in the Hundred Stream from Martham Staithe to Martham Broad; A. B.

P. zosteræfolius Schum. Barton Turf; Mrs. Cotton!

P. acutifolius Link. 28. Wretton Fen; Herb. A. B.

P. obtusifolius M. & K. Stalham Dike; A. B. Hickling; Mrs. Cotton! Barton Broad; New Cut, between Ingham and Palling. 28. Thompson's Water; G. R. Bullock-Webster!

P. Friesii Rupr. Stalham Dike; A. B. Barton; Mrs. Cotton! Hickling; T. A. Cotton! Ringmere, near Roundham Junction; G. R. Bullock-Webster. Dike near Martham Staithe; Filby Broad; New Cut, between Ingham and Palling.

Zannichellia pedunculata Fr. 28. Wolferton; G. C. Druce in *Record Club Report*, 1884–6, p. 134.

Scirpus fluitans L. Stalham; A. B.

S. Caricis Retz. Bungay, Norfolk; D. Stock in *Herb. Brit. Mus.*

Schœnus nigricans L. Near Ranworth Broad and Stalham; A. B. Beeston Bog, near Cromer; Miss D. M. Higgins. Marsh near Whitesley.

Cladium jamaicense Crantz. Near Ranworth Broad; A. B. By Hundred Stream, near Martham; by Whitesley and Heigham Sound.

Carex pulicaris L. Near Thurne.

C. teretiuscula Good. By Stalham Dike; marsh near Whitesley.

C. divulsa Good. Roadside bank between Stalham Green and Ingham.

C. rostrata Stokes. Flegg Burgh Fen; bank of Stalham Dike.

C. extensa Good. 28 is queried in Top. Bot., but I have gathered the plant in that vice-county, and it is recorded in Journ. Bot. 1899, 272, by the Rev. E. F. Linton. I have also a note of Mr. Druce finding it at Holme in 1884; A. B.

C. Hudsonii Ar. Benn. St. Faith's, 1781; Mr. Pitchford in *Herb. Brit. Mus.*

C. strigosa Huds. Bungay, 1799; S. P. Woodward in *Herb. Brit. Mus.*

C. Pseudo-cyperus L. By Rollesby Broad; bank of Stalham Dike; New Cut, between Ingham and Palling.

†*Panicum Crus-galli* L. About Norwich; Sowerby's *Grasses of Great Britain.*

Digitaria humifusa Pers. 28 is queried in Top. Bot., but, as Borrer thought (cfr. Hooker, Brit. Fl. 59 (1835)), it seems more likely to have been this species that occurred near Witchingham than *D. sanguinale* Scop.

Apera Spica-venti Beauv. Cultivated field near Frettenham Church, plentiful; C. E. S.

Calamagrostis lanceolata Roth. Wroxham Broad, north end. Near Belaugh and Bridge Broads; C. E. S. Stalham Dike; by Rollesby Broad; by the River Bure, opposite St. Benet's Abbey ruins.

Aira uliginosa Weihe. 27 is queried in Top. Bot., but the two localities there intended (see Journ. Bot. 1869, 353) are certainly in East Norfolk, being eight and twelve miles north of Norwich respectively.

Glyceria procumbens Dum. South Denes, Yarmouth, 1835; F. Barnard in *Herb. Brit. Mus.*

G. Borreri Bab. Yarmouth; Jordan in *Record Club Report*, 1879, p. 63. South Denes, Yarmouth, 1873; Trimen in *Herb. Brit. Mus.*

Festuca rubra L. var. *arenaria* (Osb.). Yarmouth; H. D. Geldart in Watson, *Exch. Club Rep.* 1892–3.

"*Triticum acutum* DC." Yarmouth, Breydon Shore; G. C. Druce, *Record Club Report*, 1883, p. 53.

Lastræa Thelypteris Presl. Horning Fen; D. Turner in *Bot. Guide*, p. 448.

L. cristata Presl. In great abundance near Whitesley, where Mr. T. A. Cotton discovered it in 1890. This is decidedly becoming rare in most of its counties, in Yorkshire verging on extinction. In this Norfolk station it occurs in great abundance, it being impossible in many parts to walk without treading on the fronds. Fortunately it is not very accessible, and is specially protected by the owner of the land.

L. uliginosa Newman. This grew with the preceding species, and seemed to prefer the bushy hillocks that rise here and there above the level of the marsh, its roots probably in the water (certainly so in the winter), but still not in such wet places as *cristata*. It was associated with *L. spinulosa*. A much disputed plant, on which many and diverse opinions were published in the old series of the *Phytologist*.

Osmunda regalis L. Calthorpe Broad, abundant; A. B. Marsh near Whitesley.

Ophioglossum vulgatum L. Bank of Dike from Martham Broad; marsh near Whitesley.

Botrychium Lunaria Sw. Seething; Mr. Kett, *Herb. Smith.*

Pilularia globulifera L. St. Faith's Newton Bogs (Pitchford); Filby Common (Stone); sides of turf-pits at Heigham and Horning (D. Turner); *Bot. Guide*, p. 449.

Chara fragilis Desv. Blackfleet Broad.

C. aspera Willd. Heigham Sound; Blackfleet Broad.—Subsp. *desmacantha* Groves. Martham Broad.

C. polyacantha Braun. Hickling; Mrs. C. Cotton! — Forma *horrida* Braun. Martham Broad.

C. contraria Kuetz. Rollesby Broad.

C. hispida L. Heigham Sound; A. B. Blackfleet Broad; Filby Broad.

Lychnothamnus stelliger Braun. Heigham Sound; Stalham Dike. In great abundance in the Hundred Stream; A. B. Blackfleet and Barton Broads.

Tolypella prolifera Leonh. Dyke near Martham Staithe. Mr. G. R. Bullock-Webster thinks that this plant has not been found before in the Broads. Its only East Norfolk record is from the Gillingham Marshes, on the extreme south-east border of the vice-county, where Mr. Bullock-Webster collected it four years ago.

IRIS SPURIA Linn. IN LINCOLNSHIRE.

By E. Adrian Woodruffe-Peacock, F.L.S.

In June, 1894, I received specimens of this *Iris* from Mr. F. M. Burton, F.L.S., who had gathered it from one of a number of masses growing in the parish of Huttoft, on the Lincolnshire coast. I also learned, after careful enquiry from the vicar, the Rev. W. T. Jennings, that this species was known to have grown there for a hundred years at least, by natives of the parish who had heard their elders talk of gathering its flowers for their merry-makings. In looking into the matter, I find *I. spuria* is recorded as far north as the Danish Island of Saltholm, in The Sound, a little south of Copenhagen, which lies in the same latitude as the Farne Islands, on the Northumbrian coast. It also extends much further south than any English soil.

Turning to my locality-register of Lincolnshire plants, I dis-

covered the following localities for a so-called *I. fœtidissima* :— Bourne Fen, after 1836; Friskney, 1879; and Sibsey, 1897. In the last case I have a note that the variety was supposed to be *citrina*. The first locality is on the authority of the Rev. J. Dodsworth, a first-rate botanist for his time, as I know from having had some of his specimens which had escaped destruction. The other two localities I have never been able to verify. None of these localities are suitable for *I. fœtidissima*, being either wet peat or fen silt. The first has long ago been changed by drainage and cultivation.

With us in Lincolnshire *I. fœtidissima*, which is a most doubtful native, was in late years found at least in three places, but only where the influence of sandy limestone or chalk is found. The fifty-nine days' frost of 1890–91 killed it off at Howsham. In Careby Wood it has not been seen since 1883, though the Rev. W. Fowler's type-specimen is in the National Herbarium. It was also found in the Shooting House Plantation, Cranwell, in 1898, but Miss S. C. Stow informs me that it is said there was once a cottage there.

With only this evidence before me, and an experience of nearly three hundred aliens in Lincolnshire which are foreign to our soils, though in many cases natives of Great Britain, I am not able to give an opinion about *I. spuria* till more facts are known. Like *Selinum*—a true native, if we have one—*I. spuria* is on its proper soil at Huttoft; but how it comes about that such a striking and lovely plant should have been passed over so long is more than I can understand. It is now found in seven localities in five ditches a little over half a mile from end to end; and has been there during the memory of the present and past generation at least—*i. e.* during all modern botanical activity. Dodsworth's record could not have been *fœtidissima*, on account of the peaty locality. He was in touch with a number of first-rate botanists through Dr. R. Latham, the lexicographer

In seeking for exact information everything fails us. There was no specimen in the ruin of the Dodsworth collection I received years ago; and Latham's notes and specimens all seem lost. Not a single copy of his printed list of Peterborough plants appears to have escaped destruction. The late Prof. Babington said he received a copy between 1830 and 1840. It took a wide range, if he remembered rightly, even into Lincolnshire, recording *Herniaria glabra* for Wilsford. Of this Dr. Latham sent Babington specimens, which are now in the Herbarium at Cambridge. I notice this lost list here in case any other worker knows of a copy. I have given the Dodsworth note-book, which is an interleaved copy of Hooker's Smith's *Compendium*, 1836, along with the type-specimens of *I. spuria* in flower and seed, and also a tube of seeds, to the British Museum Herbarium.

EAST SUSSEX NOTES.‡

By William Whitwell, F.L.S.

During 1899 and 1900 I three times spent three weeks in the beautiful but little-known district of which Horsted Keynes, East Sussex, is the centre; and, finding that the region was but little recognized in the late Rev. F. H. Arnold's "Flora" of the county (1887), I devoted myself to working out its botany as far as a very imperfect state of health allowed. The following list is the result. My three visits varied in date between May 5 and August 22, and so practically covered the greater part of the floral year.

Mr. Arnold's District IV. represents the Ouse catchment area. He observes respecting it: "This district has been well worked out by . . . . members of the Lewes and East Sussex Natural History Society." For the northern, the Wealden, portion of the district, however, his records are singularly few; though for its southern part, to which Lewes is practically central, they seem to be numerous and general in their distribution. But when it is taken into account that the southern section records a chalk flora in the main, while the northern part gives that of the Wealden sands and valley clays, the importance of a fuller extension of the enumeration for the latter is apparent. My notes may therefore be of interest.

I tender my hearty thanks to Messrs. J. G. Baker, F.R.S., and F, Townsend, M.A., F.L.S., and the Rev. E. R. Linton, M.A., for the determinations of Rosas and Menthas, Euphrasias, and Hieracia respectively; and to Mr. Arthur Bennett, F.L.S., and other friends, for kind help in respect of special cases connected with other genera and species.

For the four days June 29–July 2, 1900, I had the pleasure of Mr. F. Arnold Lees's companionship at Horsted Keynes, and some of the best records in my list (notably that of *Festuca heterophylla*) were due to his quick observation and keen discrimination.

Where Mr. Arnold has simply given a record implying general distribution of a species, I have accepted that as covering my own special area, but where he has named particular localities I have done the same—mine being purely supplementary to his. The plants marked * are, so far as I have been able to trace, new specific records for his District IV., or new varietal discriminations.

The new specific records for the Watsonian v.-c. 14, Sussex East, are two only—

Barbarea stricta Andrz. (or *? intermedia* Boreau: see observations);
Festuca heterophylla Lam.

H. K. indicates Horsted Keynes village or immediate neighbourhood. Other localities are particularized: none are more than four miles distant from H. K., and all are within v.-c. 14. †, as usual, marks introductions.

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‡ These "Notes" were prepared some months before the appearance of Mr. Salmon's interesting paper in the *Journal of Botany* for December, 1901.

Ranunculus peltatus* Schrank, var. *penicillatus* Lond. Cat. Danehill Brook (Wheeler Wood), (*teste* H. Groves). — **R. intermedius* Hiern, non Knaf. (= *lutarius* Revel.)—(*teste* H. Groves). As preceding. — *R. sardous* Crantz, var. *parvulus* (L.). New-made road beyond H. K. Railway Station.

**Berberis vulgaris* L. Roadside between Danehill and Ashdown Forest.

**Barbarea stricta* Andrz. Occasional on roadside banks, H. K. and High Brook. My naming has been supported by Mr. A. Bennett. The flowers are much larger than in the Yorkshire form. Mr. F. A. Lees, however, considered the plant to be *intermedia* Boreau. He writes: "I am unconvinced. I *restrict* 'stricta' to the specimens that have the half-ripe siliques *lying close* and spirally twisted about the rachis, with very minute bright yellow petals. I don't say that intermediates do not occur: they do, and such with neither very strictly-appressed pods, nor very patent ones, I call *intermedia*. My restricted *stricta* is truly an alien, confined to mud-banks of streams and drains where manure or cotton-mill refuse is outthrown, always commerce-brought and near a big waterway." Whether the H. K. form is *stricta* or *intermedia*, it is equally a new record for the vice-county.

Cardamine amara L. H. K., below Ludwell.

Viola palustris L. The Great Pond; Stumblewood Common, &c.

**Silene Cucubalus* Wibel. var. *puberula* Syme. Quarry on the Lindfield Road.

**Spergula arvensis* L. var. *vulgaris* (Boenn.). Various fields, H. K.

Hypericum Androsæmum L. Roadsides, H. K., frequent. — *H. elodes* L. Stumblewood Common; Ashdown Forest.

Rhamnus Frangula L. By Great Pond, H. K.

Melilotus officinalis Lam. Near H. K. station.

Vicia Bobartii Koch. Frequent about village and station.

Prunus insititia Huds. Between H. K. and Danehill.—*P. avium* L. Frequent about Birchgrove.

Geranium columbinum L. H. K. village.

Rubus Balfourianus Blox. Lindfield Road (*teste* Rev. W. M. Rogers).

Fragaria elatior Ehrh. Bank below copse on road to station, in some plenty.

Rosa tomentosa Sm.—**R. canina* L. var. *verticillacantha* Baker, non Merat. — Var. *urbica* (Leman), possibly *frondosa* Stev. All Lindfield Road.

Chrysosplenium oppositifolium L. Burstow Bridge; Birchgrove.

**†Ribes Grossularia* L. Lindfield Road.

Sedum Telephium L. var. *purpureum* L. Between High Brook and West Hoathly.

Myriophyllum spicatum L. Pond on Ashdown Forest, near Wych Cross.

Callitriche hamulata Kuetz. As foregoing.

Peplis Portula L. Pond off Chailey Road.

**Epilobium montanum* L. var. *verticillatum* Koch. Between H. K. and Lindfield. — *E. adnatum* Griseb. Between station and Sheriff Farm.—*E. obscurum* Schreb. Chailey Road.

Apium inundatum Reichb. fil. The Great Pond, H. K.

Ægopodium Podagraria L. H. K.; Birchgrove; Lindfield.

**Pimpinella Saxifraga* L. var. *dissecta* With. Quarry on Lindfield Road, &c.

Viburnum Opulus L. By stream, Lindfield Road.

Galium erectum Huds. Field between H. K. and "Valley Holme."

**Valeriana sambucifolia* Willd. Wheeler Wood, H. K.

Valerianella dentata Poll. Station Road.

Gnaphalium uliginosum L. Abundant. Mentioned only because Mr. Arnold has omitted it altogether.

Bidens tripartita L. The Great Pond; Broadhurst.

Achillea Ptarmica L. West Hoathly; Birchgrove, &c.

Anthemis Cotula L., form *discoidea*. Near H. K. station.—**A. arvensis* L. Abundant on road from H. K. station towards Highbrook; apparently introduced. The road was constructed only a few years ago, of chalk and flints, and a thick substratum of clay.

Chrysanthemum segetum L. Newnham's Farm.

Serratula tinctoria L. Wood above the Great Pond.

Cichorium Intybus L. Between Highbrook and West Hoathly.

Crepis taraxacifolia Thuill. Plentiful on same new road as *Anthemis arvensis*. It also occurs occasionally along other main roads (mended with flints) near H. K.

**Hieracium vulgatum* Fr. var. *maculatum* (auct. angl.). Rocky hedge-banks on the Lindfield Road. — **H. rigidum* Hartm. vars. *acrifolium* Dahlst. and *scabrescens* Johanss. Between H. K. and Birchgrove.—Var. *tridentatum* Fr. Between Highbrook and West Hoathly. — **H. boreale* Fr. As foregoing. — *Var. *Herrieri* Arv. Touvet. Lindfield Road.—*H. umbellatum* L. Between H. K. and Birchgrove.

Lactuca muralis Fresen. Chailey Road; Lindfield Road.

Jasione montana L. Between Highbrook and West Hoathly. (Also in District VII., near West Hoathly.)

Lysimachia Nummularia L. Lindfield Road. — *L. nemorum* L. Frequent about H. K., &c.

Anagallis tenella L. Stumblewood Common.

Menyanthes trifoliata L. The Great Pond, in great quantity.

Echium vulgare L. Newnham's Farm.

Euphrasia Rostkoviana Hayne. Wheeler's Wood; between H. K. and Birchgrove. (Also in District I., Linchmere Common.) — *E. nemorosa* H. Mart. Roadside and heath beyond the Great Pond. — *E. gracilis* Fries. Wide heathery roadside between H. K. and Birchgrove (with *Rostkoviana*).

Bartsia Odontites Huds. var. *verna* (Reichb.). The Great Pond.

**Mentha arvensis* L. var. *Allioni* (Bor.). The Great Pond.

Calamintha Clinopodium Spenn. Wood by the Great Pond.

Scutellaria galericulata L. Wheeler's Wood; the Great Pond. — *S. minor* Huds. With the foregoing, in both localities. Also Press Ridge Warren and Stumblewood Common. Where both occur, the *minor* takes luxuriant forms which suggest hybrids, but separation between these and the frequent elongated broad-leaved form of the type is difficult.

Stachys arvensis L. Great Odynes Farm.
Galeopsis Tetrahit L. Occasional about H. K.
Lamium Galeobdolon Crantz. H. K.; Birchgrove.
**Populus tremula* L. var. *glabra* Syme. Chailey Road; near Highbrook.
Taxus baccata L. H. K. village; Press Ridge Warren.
**Epipactis media* Bab. Bank below copse on road to station.
Habenaria bifolia R. Br. Chailey Road.
Narcissus Pseudo-Narcissus L. Divall's Farm, Birchgrove; probably introduced, as the *flore pleno* form is also present.
Allium ursinum L. Keysford Bridge, &c.
Narthecium ossifragum Huds. Stumblewood Common; Ashdown Forest.
Luzula Forsteri DC. Park Road, Lindfield.
Lemna trisulca L. Great Plummerden.
Potamogeton polygonifolius forma *ericetorum*. Ashdown Forest; Stumblewood Common.—*P. pusillus* L. Burstow Bridge.
Scirpus fluitans L. Pond on Forest, near Wych Cross. — **S. sylvaticus* L. Keysford Bridge; near Lindfield.
Rynchospora alba Vahl. Ashdown Forest.
Carex pallescens L. Wheeler's Wood. — **C. pendula* Huds. Burstow Bridge; Lindfield Road; frequent near West Hoathly.—*C. lævigata* Sm. Wheeler's Wood; Great Pond; Forest near Wych Cross. — **C. binervis* Sm. Chailey Road. — *C. vesicaria* L. The Great Pond; Broadhurst Ponds.
Molinia varia Schrank. Heath-land beyond the Great Pond.
**Poa nemoralis* L. var. *vulgaris* Gaud. Lindfield (Town Hill).
Festuca Myuros L. Newnham's Farm. — *F. sciuroides* Roth. H. K. — *†*F. heterophylla* Lam. Roadside bank, west boundary of Paxhill Park. Certainly a casual here.
Bromus arvensis L. Newnham's Farm.
Lomaria spicant Desv. Wheeler's Wood.
Lastræa spinulosa Presl. Chailey Road.
Equisetum maximum Lam. On the clay edges of the new road described under *Anthemis arvensis*. This was made by the Railway Company. Whence the clay, chalk, and flints were brought I could not ascertain. The species is abundant here, and in profusion on the steep line embankment on the other side of the station. It is evidently introduced; I could not trace it anywhere else in the H. K. region. — *E. palustre* L. Plentiful on roadside by Burstow Bridge. — Var. *polystachyum* auct. With type, in plenty; very characteristic. I am in great doubt whether this and the type must not be considered introductions as well as *E. maximum*. They occur at the ending of the same new road, on the side of it. A deep stream valley runs just below, but I could not see them in that, nor elsewhere in the district.
Nitella flexilis Agardh. Between the Great Pond and Broadhurst.

In the late Mr. Roper's *Flora of Eastbourne* (1875) the author gave a list of plants omitted from it as not having been met with by himself, nor being represented in the Borrer Herbarium at Kew;

but which had previously been recorded for the Cuckmere district (Arnold's V.), though apparently not within recent years.

During a short stay at Eastbourne in July–August, 1897, I met with the following three species named in that list:—‡

Campanula rotundifolia L. A patch of about a dozen plants on the down above Willingdon. The Misses Thomas, of Wannock House, who know the flowers of the Wannock and Willingdon neighbourhood well, have found it at this spot, they inform me, but nowhere else in V. The all but total absence of the species is singular. Has it been thrust out by its vigorous relative, *Phyteuma orbiculare*, which flourishes over the Eastbourne downs in hundreds of thousands? The two grow together on the Findon Downs (West Sussex), but their proportions are (1901) almost reversed.

Rubus Idæus L. Thickets on the downs above Wannock and Willingdon. (Not named by Arnold for Dist. V.)

Verbascum Blattaria L. Roadside, West Dean. (Arnold: "no recent reliable reports.")

The occurrence in the Cuckmere district has not, to my knowledge, been recorded of—

†*Lepidium Draba* L. Abundant on pond-bank, &c., in the grounds of Wannock Mill. It was pointed out to me in 1897 by the Misses Thomas, who had known it there for a number of years, but had never seen it elsewhere.

Other extracts of interest from my note-books and herbarium relating to Sussex East are—

Viola lactea Sm. VI. "Waterdown Forest, in the Strawberry Gardens, Frant, May, 1868; A. Carr." Herb. *Miss E. Foulkes Jones.* — Var. *intermedia* H. C. Watson. VII. Broadwater Forest, 1870; *W. W.*

Arenaria serpyllifolia L. var. *glutinosa* Koch. Dist. V.; new to vice-county. Eastbourne Beach, 1887; *Mr. R. Oakeshott; teste A. Bennett.*

Ornithopus perpusillus L. and *Spiræa Filipendula* L. IV. The Downs, Seaford, 1879; *W. W.*

Serratula tinctoria L. VII. Broadwater Forest, 1869; *W. W.*

Filago minima Fr. IV. The Downs, Seaford, 1879; *W. W.*

Wahlenbergia hederacea Reichb. VII. Broadwater Forest, 1870; *W. W.*

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‡ Since writing this paper, I have, through the kindness of Mr. Daydon Jackson, been able to see all Mr. Roper's reports to the Eastbourne Natural History Society, presented as supplemental to his *Flora*. These show that after the issue of the *Flora* he personally observed all three species within the Cuckmere district. But, as his localities are none of them the same as mine, I have allowed my remarks to stand unaltered. One passage in his report for 1875 is specially interesting:—"*Campanula rotundifolia* . . . . is only included in our list, I believe, from a single plant having been found many years back near Wannock, but it is worthy of notice that it occurs in tolerable abundance in the road from Catsfield to the Peppering Powder Mills." Catsfield is at the extreme east of the district, many miles away from my Willingdon (probably = "near Wannock") station, and on the Wealden formation.

Bartsia viscosa L. V. Bexhill, 1897; *W. R. Hayward;* to show still there.

Chenopodium polyspermum L. var. *cymosum* Moq. VI. Near garden allotments, Frant; *A. Carr*, 1868.

Habenaria bifolia R. Br. VI. Waterdown Forest, Frant; *A. Carr*, 1868.

Spiranthes autumnalis Rich. VI. New House Farm, Frant; *A. Carr*, 1868.

Epipactis palustris Crantz. V. Near Bexhill, 1897; *W. R. Hayward.* New to district.

Scirpus fluitans L. VII. Ramslye Farm, Broadwater Forest, 1886; *Dr. George Abbott.*

Lepturus filiformis Trin. and *Hordeum maritimum* With. IV. Seaford, 1877; *W. W.*

Lastræa spinulosa Presl. VII. Broadwater Forest, 1870; *W. W.*

Ophioglossum vulgatum L. V. Downs near Wannock, 1898; *Misses Thomas.* Roper's and Arnold's records are of low-lying damp localities only.

"A NEW HYBRID GRASS."

By G. Claridge Druce, M.A., F.L.S.

On p. 41 the Rev. E. F. Linton published a note under the above title on a grass found by him, which had been distributed through the Botanical Exchange Club when I was editor of the report for 1900. The grass was sent to me bearing a printed label—

"Ex herb. E. F. Linton.
Bromus commutatus Schrad. × *Lolium perenne* L., hybr. nov.
Avon meadows, near Barton, S. Hants.
Legit ipse. 9th July, 1900."

Notwithstanding the positive terms in which the assumed parentage was stated on the label, and especially as one of the stated parents belonged to a genus in which I take some considerable interest, I made a minute examination of the grass, but neither in the culm, leaf, nor inflorescence could I see the slighest trace of the presence of any *Bromus*; in fact it appeared to be a monstrous form of *Lolium perenne* L., and I sent specimens to Professor Hackel, strongly querying the combination made by the Rev. E. F. Linton. It was in answer to this that Prof. Hackel stated that he identified the specimen as *Lolium perenne* L. var. *sphærostachyum* Masters in Journ. Bot. 1863, p. 8. Dr. Masters, *l.c.*, in his interesting paper, which the Rev. E. F. Linton does not allude to, shows that this variety is one of the many deviations from the type of *L. perenne* which are found. In this particular instance the deviation affects the arrangement of the florets, so that "in place of being flattened and somewhat pointed at its free end, it becomes in this variety almost spherical, hence this variety might be called var. *sphærostachyum*. It may exist independently of any other change, but

more frequently it is combined with partial or complete obliteration of the stamens and pistils, and the substitution for these organs of an equivalent or an increased number of scales. For three years in succession I have noticed plants affected with this variation or deformity, in the same locality, intermingled with specimens of the usual appearance." The scales in specimens of this variety may be derived from the paleæ or from the base of the stigmata, and their duplication, as in the flowers of *Galanthus*, cause the inflorescence to become more or less spherical.

It is only fair to say that at the date, 1863, when Dr. Masters wrote his interesting paper, in which this and other forms are described—and I may also refer to another paper on *Lolium perenne* by him, which appeared in the Journal of the Linnean Society, vii., pp. 120–124—the occurrence of hybrids in the vegetable kingdom was not acknowledged in Britain as they are at the present day. Still, I do not think even now that Dr. Masters would claim a hybrid origin for his variety. Probably it was considered to be a monstrous form by the various editors of the *London Catalogue*, as it is omitted from the various editions with which I am cognisant, and Dr. Boswell Syme, in Eng. Bot. xi. p. 186, says: "monstrosities of the spike are not unfrequent . . . sometimes the florets are fasciculate within the glumes, and in this are frequently inflated and abbreviated, so as to be ovoid, and sometimes shorter than the glumes."

The Rev. E. F. Linton, however, suggests that, while not disputing Prof. Hackel's identification of the Avon plant with Dr. Masters's variety, yet that both the Avon plant and the var. *sphærostachyum* owe their peculiarities to their hybrid origin, and that while "*Lolium perenne* was the obvious constituent, *Bromus commutatus* L. [*sic*], which was present in abundance, would account for the differences in this puzzling grass."

In order to get a definite opinion on this point, I wrote to Prof. Hackel, who replies: "I remember that it was a true *Lolium*, and not a hybrid with *Bromus*; I believe that the crossing of *Lolium* and *Bromus* is totally impossible; these two genera are much more distant than *Lolium* and *Festuca*, especially in the structure of the fruits, their starch-grains, &c."

One can scarcely expect uniformity of opinion respecting many forms of plants, and the speculative suggestion as to parents of supposed plant-hybrids must necessarily vary with individual opinion; but, speaking for myself, I am able to see in this no trace of a *Bromus* parentage (the one which is placed first on the Rev. E. F. Linton's label). I do not consider it either "a new hybrid grass," or even a newly described form.

WATSON BOTANICAL EXCHANGE CLUB REPORT, 1900–1901.

[The following notes are extracted from the Report of the Watson Botanical Exchange Club for 1900–1, which was issued in August last. Messrs. E. S. and C. E. Salmon were distributors for the year; the Secretary of the Club is Mr. H. S. Thompson, of 30, Waterloo Street, Birmingham.]

Lepidium ruderale L. Dry bank, Aylestone, Leicester, Aug. 1900. This, a few years ago, was only found in one locality; now it has become more plentiful in that locality, and a fresh one is recorded on the opposite side of the town.—W. Bell. Correct. This rapid spreading of *L. ruderale* is occurring in many of the larger towns. About London it is already one of the commonest waste-ground weeds.—S. T. D[unn].

Silene conica L. Near Parkstone, Dorset, June 14, 1900. This plant, hitherto queried as an alien for the county, appears to me on investigation to be thoroughly native; for, though the area in which I saw the plant is very restricted, it is a perfectly natural one, and the Rev. W. Moyle Rogers tells me that it is nearer two miles than one distant from that reported by Mr. Hussey in 1886. — E. F. Linton.

Malva pusilla Sm. (1) South of lighthouse, Kingston, West Sussex, Aug. 1900.—T. Hilton. (2) Cultivated land east of Brighton, East Sussex, Aug. 1900.—T. Hilton. (3) Tripcock Ness, West Kent, Aug. 18, 1900.—A. H. Wolley-Dod. (4) Amongst long grass by roadside, Shortland, Kent, Sept. 5, 1900. — D. T. Playfair.

The small-flowered Malvas of North Europe have been much confused. Linnæus (Fl. Suec. (1755) 243) under *M. rotundifolia* writes: "Apud nos flores communiter minores, corolla omnino alba; Stockholmiæ autem corolla majore purpurascente obvia planta, isti apud exteros." It thus appears that he included *M. neglecta* Wallr., with its petals two or three times as long as the calyx and purple, and also *M. borealis* Wallm., with petals pale and about equal to the calyx. Most English botanists mean by *M. rotundifolia* Linnæus's species after *M. borealis* Wallm. (*M. pusilla* Sm.) has been removed. But in Koch's Synopsis, ed. 3, i. 418, and elsewhere, *M. neglecta* Wallr. is kept up, while *M. rotundifolia* L. refers only to smaller-flowered plants (*M. borealis* Wallm.). *M. parviflora* L. is readily separable by its enlarged fruiting calyx, and *M. nicæensis* by its broad outer calyx-segments. All the plants submitted to me are *M. borealis* Wallm.—S. T. Dunn.

Geranium rotundifolium L. Garden weed, Bromley, Kent, June, 1900. Two plants appeared in my garden three years ago, and it is now abundant there. Five or six years ago it was found in a garden at Bickley, about 1½ miles from me. I can give no explanation of its appearance hereabouts; no one in the district has a botanical garden.—D. T. Playfair.

Sedum album L. var. *teretifolium* Haw. Fishergate Cliffs, West Sussex, July, 1900.—T. Hilton. Correct. This seems like a native habitat, but the matter can only be decided locally. The species is a widely distributed native of the Continent, on rocks and stony ground, reaching as far as Normandy. It is also considered by Murray to be indigenous in a few localities in the Mendip Hills of Somerset.—S. T. D[unn].

Galium anglicum Huds. Between Seaford and Berwick, East Sussex, July, 1900. The occurrence of this species in the county is queried in Top. Bot., and the plant does not appear in Arnold's Sussex Flora. First discovered here by the Rev. E. Ellman.

Inula britannica L. Shore of Cropston Reservoir, Leicester, Aug. 1, 1900. This plant, a native of Germany, first appeared at Cropston in 1894, when it was noticed by the Rev. T. A. Preston. It is now quite naturalized on the margin of the reservoir, and has increased in luxuriance. Probably introduced here by water-fowl. See B. E. C. Reports, 1894, p. 451, and 1895, p. 485.—T. A. Preston and A. B. Jackson.

Matricaria discoidea L. Casual, waste ground, Birkenhead, Liverpool, v.-c. 58, June 17, 1900.—J. A. Wheldon and A. B. Jackson. Correct. Usually, as in this case, in waste ground, but occasionally well established in open turf, as on Kew Green. Where a footing has once been gained, it seems to spread rapidly to any dry newly-broken ground in the neighbourhood.—S. T. Dunn.

Symphytum officinale L. var. *patens* (Sibth.). River Esk, Midlothian, June 5, 1900. Colour variety of the type conforming to Sibthorp's description in Fl. Oxon.—F. C. Crawford. As Mr. J. W. White has pointed out in Journ. Bot. 1900, p. 279, the figure in Eng. Bot. ed. 3, does not represent Sibthorp's *patens*. Prof. I. Bayley Balfour remarks as follows: "The above specimens are from one of the stations mentioned by Boswell Syme whence he had obtained the variety, and I think we may assert they correspond with what he found. Sibthorp in his Flora of Oxford speaks of the plants as the red-flowered Comfrey, and the only other distinctive character he gives is one derived from the calyx. The plant we always have called *patens* here, and which, I take, it Boswell Syme referred to, has never to my knowledge had blue flowers, and one finds the typical *officinale* mixed with plants in which the flower passes into purple. Apart from colour, the hairiness is the only thing given by Hooker as a distinctive mark. This character is never a constant one in the plants about here, and, so far as I have been able to give consideration to the matter, I have come to the conclusion that there is no character by which *patens* may be distinguished from *officinale* except by that of colour. I think it is probable that *officinale* is the form which is essentially that of roadsides, while *patens* is one of moister localities. With regard to the length of the calyx compared to the corolla-tube, my observations lead me in exactly the same direction as Boswell Syme. There does not seem to be any fixity in the character."

Rumex ——. By lake, Hawkesyard, Staffordshire, Aug. 1900. This Dock is very like *conglomeratus*, but pedicel-joints are very low down, as in *sanguineus*.—H. P. Reader. This Dock is intermediate, as Mr. Reader states, between *conglomeratus* and *sanguineus*. I have compared it with authentic material of *R. conglomeratus* var. *Borreri* Trimen in Journ. Bot. xiv. p. 310, a plant coming from Burgess Hill, described as intermediate between *nemorosus* and *conglomeratus*, but the whorls in var. *Borreri* are more leafless, and it is much more strongly trituberculate. It therefore does not agree with this variety. The only other British named variety of *conglomeratus* with which I am acquainted is var. *subsimplex* Trimen in Journ. Bot. xv. p. 134. As may be inferred from the name, this is a subsimple plant, and does not agree with Mr. Reader's specimens. The following is an extract (in translation) from a paper by Prof. C. Haussknecht in Mitteil. der Geogr. Gesellschaft, iii. p. 73, on two forms of a hybrid between *R. conglomeratus* and *R. sanguineus* to which he has given the name *R. Ruhmeri*: "Two forms of this hybrid lie before me. One has the habit of *R. sanguineus*, with erecto-patent short branches, whose few-flowered whorls are leafy almost to the apex. Flowers nearly all sterile, and easily falling off; mature fruits occur only very sparsely, and their inner fruiting sepals have entire margins and roundish-oblong unequally developed tubercles. Collected near Löbitz, near Osterfeld, and near Zeutsch. The other form, observed between Zöbschen and Unterkaka, near Osterfeld, is much taller, with many stems, with much elongated more flexuous erecto-patent branches, leafy to about two-thirds their length. Whorls few-flowered, some of them quite sterile, others with 1–4 mature fruits. Inner fruiting sepals with 2 rather small and 1 rather large broadish wart; nuts apparently well developed, but for the most part empty. I observed similar forms also on the Ettersberg. On account of such forms as the above, the two species were previously united by many botanists." I doubt Mr. Reader's plant being either of the forms of the hybrid—the fruit is too good for one thing. It is a very interesting plant, and I very much doubt if there is a published name that will exactly fit it.—E. G. Baker.

Cyperus fuscus L. Peaty valley below Weston-in-Gordano, North Somerset, Sept. 27, 1900.—J. W. White. A beautiful series of the plant from North Somerset, from which county it was recorded in Journ. Bot. 1900, p. 446. These specimens are unusually tall and fine; similarly luxuriant plants, however, occur in the Kew Herbarium, labelled "Hillbrook Meadow, Little Chelsea. Coll. Stevens, Sept. 1847."—E. S. & C. E. S.

Scirpus cernuus Vahl, var. *pygmæus* (Kunth). Carradale, Cantire, Aug. 28, 1898. Coll. A. M. Geldart.—H. D. Geldart, The name *pygmæus* cannot be used for the present plant, as Kunth intended by it identically the *Scirpus cernuus* of Vahl, which Kunth himself quotes (Enum. Pl. ii. p. 191) as a synonym. Apparently the proper name for the present plant—which, however, can scarcely be considered anything more than a form—is var. *monostachys* Hook. Stud. Fl. 400 (1870).—C. B. Clarke.

Anthoxanthum Puelii. Sandy ground, Hawkesyard, Staffordshire, July, 1900.—H. P. Reader. *A. Puellii* can be distinguished from *A. odoratum* by the relative length of its barren and fertile glumes. It is not safe to rely on the character supplied by its branching, as, though it is usually much branched and *A. odoratum* not at all, continental specimens occur agreeing generally with the latter, but distinctly branched. The length of its awns also must not be lightly used as a guide, as long-awned *A. odoratum* is not uncommon in England in poor sandy ground. Mr. E. S. Salmon has pointed out to me that the split barren pale sometimes ascribed to *A. Puelii* (as in Trimen's fig., Journ. Bot. 1875, t. 157) does not naturally occur in either species. Both have, however, a hyaline line beneath the awn from the point of its insertion to the apex of the pale, and due presumably to the pressure of the awn during development. The pale usually splits along this line if handled. The present specimens are correctly named.—S. T. Dunn.

Azolla caroliniana Willd. Alien. Introduced probably from Canada. On pond in private grounds, Hayes Place, Kent, July, 1900. This made its appearance in the autumn of 1899 as a few small patches floating on the surface of the pond, having been in all probability introduced from Canada with some water-lily roots. It spread during the spring of 1900 with great rapidity, till in the early summer it had entirely covered the surface of the water with a beautiful thick moss-like carpet varying in tint from a bright green to a distinct red. . . . Apparently the first record of its naturalization in Europe. It is an annual cryptogam, whose megaspores float at the time of fertilization, and are firmly attached to other floating matter by means of the barbed hairs on the *massulæ*. There can be little doubt that their adhesion to the water-lilies, mentioned by the contributor as imported from Canada and grown in the same pond, was the means of their introduction.—S. T. Dunn.

[Mr. Dunn has overlooked the account of the naturalization of *Azolla* in a garden pond at Ashford, Co. Wicklow, published in this Journal for 1893, p. 249.—Ed. Journ. Bot.]

ALFRED WILLIAM BENNETT
(1833–1902).

Alfred William Bennett was born at Clapham, Surrey, on June 24, 1833. He came of a botanical stock; his father, William Bennett, was one of the discoverers of *Teucrium Botrys* at Box Hill in 1844, and published in the *Phytologist* (iii. 709–715) an account of the ferns observed in 1849 during a pedestrian tour which he took with his two sons, Alfred William and Edward Trusted—the latter, two years Alfred's senior, survives him; notes from each of them appear in the *Phytologist* between 1851 and 1854.

It was not, however, until 1868 that Alfred definitely devoted himself to botany. For ten years before this he had been a publisher in Bishopsgate Street; he was the first to use photography in book-illustration, and introduced to the public various minor poets, including one who takes a front rank among them, if indeed he cannot claim a higher place—the late Lord De Tabley. In the same year he joined the Linnean Society; he had taken his M.A. degree at the London University about 1856, and later his B.Sc. From this time he took an active part in botanical work in this country: he was a frequent attendant, up to his death, at the meetings of the Linnean and Royal Microscopical Societies, and at the gatherings of the British Association; and contributed papers to the proceedings of each of these bodies. He was also for many years Lecturer on Botany at St. Thomas's Hospital and at Bedford College.

Bennett's contributions to botanical literature were considerable. Many papers which appeared in the publications of the above-named Societies stand under his name in the Royal Society's *Catalogue of Scientific Papers;* others appeared at intervals in this Journal, to the first volume of which he contributed; and some, more popular, in the *Popular Science Review*. He was at one time biological sub-editor for *Nature*, for many years botanical reviewer for the *Academy*, and up to the time of his death principal editor of the Royal Microscopical Society's *Journal*. He also published numerous articles on the subject of fertilization.

Bennett's contributions to systematic work were fairly numerous. He monographed the *Hydroleaceæ* (on which he had earlier published a memoir), *Pedalineæ*, and *Polygalaceæ* for Martius's *Flora Brasiliensis;* on the last-named order he contributed papers to this Journal in 1877–79. His list of the freshwater *Algæ* and *Schizophyceæ* of Hants and Devon appeared in the R.M.S. Journal for 1890, and a similar paper on those of Surrey in the volume for 1902.

His most important work in the way of text-books was the English version of Sachs's *Lehrbuch der Botanik;* this he translated and edited for the Clarendon Press in 1875, with some assistance from Mr. W. T. T. (afterwards Sir W. Thiselton-) Dyer. In 1877 he performed a similar office for Thomé's Textbook; this translation went through several editions: he also helped Dr. Masters with the fourth edition (1884) of Henfrey's *Elementary Course*.

In 1889, in conjunction with Mr. George Murray, Bennett produced *A Handbook of Cryptogamic Botany*, of which the longest review that ever appeared in our pages was contributed by the late Percy Myles to this Journal for the same year. Bennett undertook the Vascular Cryptogams, Mosses, Algæ, and Schizophyceæ.

In 1886 Bennett issued *The Tourist's Guide to the Flora of the Alps*—an English version of Dalla Torre's book on the subject. He had previously prepared a translation of Seboth's *Alpine Plants painted from Nature*, a book useful mainly on account of its illustrations; and in 1896 he published *The Flora of the Alps*, for the pictures of which no good word can be said. This is, indeed, the least satisfactory of Bennett's works, although it was honoured

by long notices, as eulogistic as they were ill-informed, in the *Times* and other newspapers; a more accurate estimate from a botanical standpoint will be found in this Journal for 1896, p. 325.

Mr. Bennett's death, from heart-disease, occurred with startling suddenness on the 28th of January. He was proceeding home on the top of an omnibus from the Savile Club, of which he was a member, to his residence in Park Village East, Regent's Park; at Oxford Circus he fell forward, and life was found to be extinct. He was buried at Isleworth, in the cemetery of the Society of Friends, of which body, like so many of our botanists, he was a member.

SHORT NOTES.

Stellaria umbrosa Opitz.—This species has not, so far as I am aware, been recorded for Montgomeryshire. It was found in some quantity by Miss E. Foulkes Jones, on a hedge-bank, Forden Road, Montgomery, early in May, 1896. Specimens with ripe seeds gathered three weeks later left no doubt as to the specific identity of the plant. The naming has been confirmed by Mr. Arthur Bennett.—William Whitwell.

Solanum rostratum Dunal (pp. 42, 81).—I found this plant last autumn, in two places near Par; I saw it again at Porthpean, and my friend Mr. Davey had it sent to him from near Hessenford,—all places in Cornwall.—A. O. Hume.

In September, 1900, while botanizing at Honiley, Warwickshire, I came across this prickly *Solanum* among rubbish near a dilapidated cottage by the roadside. There was only a single specimen, which was conspicuous at a considerable distance by reason of the bright yellow flowers. Last summer a specimen of the plant was sent me by my cousin Mr. J. P. Jackson, who found it growing among nettles at Ascot, Surrey.—A. Bruce Jackson.

Tetraplodon Wormskioldii Lindb. in Teesdale. — Mr. M. B. Slater, of Malton, on reading the paper on this plant by Mr. Jones and myself in the February number of this Journal, was reminded of a *Splachnum* collected by himself and the late Mr. S. Anderson in the year 1870, and almost in the same spot. This plant had been in his herbarium all this time, queried as a robust form of *Tetraplodon mnioides*; there is no doubt, however, that it is *T. Wormskioldii*. Mr. Slater's specimen was collected in June, and is covered with fruit in excellent condition, while the plant found by us in August had only a few old capsules. I take this opportunity of correcting an error in our paper; the latitude of Widdy Bank Fell is about 54° 40′, and not as given in the text.—E. C. Horrell.

NOTICES OF BOOKS.

LEGRÉ (LUDOVIC). *La Botanique en Provence au XVIIIe Siècle.* Pierre Forskål et le Florula estaciensis, Marseille: Barlatier. 1900. Pp. 27. 8vo.

——— *Indigénat en Provence du Styrax officinal.* Pierre Pena et Fabri de Peiresc. Marseille: Aubertin & Rolle. 1901. Pp. 23. 8vo.

——— *La Botanique en Provence au XVIe Siècle.* Louis Anguillara—Pierre Belon—Charles de l'Escluse—Antoine Constantin. Marseille: Aubertin & Rolle. 1901. Pp. 195. 8vo.

THE readers of the *Journal of Botany* are familiar with the character of the work which is so energetically carried on by M. Legré, the earlier issues of these publications having been reviewed in 1899, pp. 88–92, 283; 1900, pp. 43–45. The three works named at the head of this article show that the author is continuing his enthusiastic researches into the botanic history of Provence.

The first book on our list is of comparatively recent date. Pehr Forskål, on his eastern journey which was to end in his death at Jerim in 1763, touched at Marseilles, and, while waiting for an opportunity to continue his voyage, noted the plants he found at L'Estagne, a small village on the western side of the bay in which Marseilles is situated. This list figures as the Florula estaciensis of Forskål's posthumous *Flora Ægyptiaco-Arabica*, pp. iii–xii.

This enumeration consists of 265 plants, eight of which were Cryptogams, and two, *Chamærops* and the orange, were cultivated. The account must be as interesting to a native of the South of France as Kalm's statements as to the botany of England in 1748, when he was on his way to North America, are to English people. It may be mentioned in passing, that Linnæus seems to have tried to preserve the pronunciation of his pupil's name when establishing the genus *Forskohlea* in 1767, by varying the second vowel of Forskål's name.

The next work on our list again brings before us the name of Pierre Pena, which has been previously rescued by the author from the almost complete oblivion into which it had fallen; and also introduces Nicholas Claude Fabri de Peiresc, the antiquarian, philologist, and naturalist, whose letters have lately been published under the editorial care of M. Tamizey de Larroque in a series of volumes. Letters which passed between Clusius—then finally settled at Leyden—and Peiresc, show not only that Pena was the actual discoverer of *Styrax officinalis* in Provence, but confirm several statements relative to the authorship of certain passages in Pena and Lobel's *Adversaria*.

The last on our list is the largest of the three, and treats of four of the old-time botanists. M. Legré brings before us the modest but learned personality of Luigi Anguillara, his travels, and his readiness to place the store of his information, so laboriously

acquired, at the disposal of his correspondents. He was unfortunate enough to rouse the jealousy of Mattioli, who wrote in extremely harsh terms of Anguillara. The author gives fourteen Provençal plants which are to be found in the *Semplici*, five of them recorded for the first time in the district.

Pierre Belon mentions twenty-one plants as occurring in Provence, each of which is taken into consideration by M. Legré; whether Belon made one or two visits to the region is uncertain, but it is clear that Belon knew each part of it and its natural productions from a long stay in it.

Charles de l'Escluse is a botanist who stands by himself in a class of his own; he attracted the admiration and esteem of his contemporaries by his deep acquaintance with plants, his accuracy, and his scrupulous regard for the claims of others; there is a charm about the man and his writings which is irresistible. His stay in Provence with Rondelet was long enough for him to gain a familiar knowledge of the plants in the localities round Montpellier, and to the end of his days he was delighted to recall the happy time when he was the pupil, the guest, and the secretary of Rondelet. Our author traces the steps of Clusius through Provence during his residence in it, which he quitted in 1554, and never revisited. The young Peiresc, mentioned in a previous paragraph, became a correspondent of Clusius, and although he did not succeed in his project of inducing Clusius to visit the South once again, he visited Clusius at Leyden, and, on his return home, sent plants to him.

M. Legré gives fourteen plants as cited by Clusius as growing in Provence, with a commentary on each; furthermore, he prints a curious "Inventaire de ce qui est contenu en la boitte que de Peirets envoye à Mr. de la l'Escluse par la foire de Francfort," with two lists of plants contained in it, amounting to seventy—some, however, being mentioned twice under different points of view. Two unpublished letters from Peiresc to Clusius are also appended, with the recipient's careful dockets on the same.

The last name in the volume is that of Antoine Constantin, a local apothecary, who designed a work, *Traité de la pharmacie provençale*, of which one volume came out in 1597, and in it the mention of twenty-eight Provencal plants as supplying medicines. The remaining unpublished manuscript was extant in the time of Garidel (1715), and it would be interesting to know what befell it.

Three indexes—of persons, places, and modern botanic names—close the well-printed volume. We can only renew our thanks to the author for this most interesting gallery of portraits, worked up with loving care and solicitude—a mosaic of facts woven into an intelligible whole. As we have previously said, the period is an extremely attractive one; the actors are varied in many respects, from the renowned, as Clusius and Peiresc, to the obscure, as Hugues de Solier. We trust that the author may long continue his painstaking researches into a period of so much antiquarian and botanic interest.

B. Daydon Jackson.

Some New Text Books.

Elements of Botany. By W. J. Browne, M.A., M.R.I.A., Inspector of Schools. Fifth Edition. Re-written and greatly enlarged. 8vo, pp. viii, 272. Manchester and London: John Heywood. 1901. Price 2s. 6d.

A Laboratory Course in Plant Physiology. By W. F. Ganong, Ph.D., Professor of Botany in Smith College. 8vo, pp. vi, 147. New York: Holt. 1901.

A Manual of Botany. Vol. ii. Classification and Physiology. By J. Reynolds Green, Sc.D., F.R.S. Edition 2. 8vo, pp. xiv, 515. London: Churchill. 1902. Price 10s.

Outlines of Botany for the High School, Laboratory and Class-room. By Robert Greenleaf Leavitt, A.M. 8vo, pp. 272, tt. 384. American Book Company.

In looking over the papers of elementary students of botany, one is often impressed with certain remarkable statements, which can hardly be the result of imagination on the part of the examinee. Books like Mr. Browne's *Elements of Botany* help to explain the origin of some of these wonderful answers. It is very sad to think that such a book can reach a fifth edition and therefore presumably flourish, and that, too, under the ægis of an inspector of schools. Like many another book, "not written on the lines of any examination course, it will be found to meet fully the requirements" of the Science and Art Department in Great Britain, the matriculation course of the University of London, and other examinations. Much of the subject-matter is as good as that of other books which by a happy coincidence manage to hit the lines of certain popular examinations, but now and then we come upon a statement which makes us shudder and wish that Mr. Browne had not included botany among the various subjects on which he has written in his series of Elementary Science Manuals. For instance, in describing the course of events in the germination of a bean, he says, "the seed-lobes or cotyledons consist chiefly of starch, which is insoluble in water, and therefore is not altered by moisture alone; its composition is $C_6H_{10}O_5$. When the proper heat occurs, with a supply of air, the starch takes oxygen from the air; this oxygen unites with a part of its carbon, forming carbonic acid, which escapes, and the remaining part of the starch forms grape-sugar, $C_6H_{12}O_6$." His explanation of the details of this chemical process is ingenious, but not helpful. Three pages on, the prothallium of a fern is described as "a small flat expansion of a temporary nature, which bears the reproductive organs corresponding to pollen grains and ovules on its lower surface"; and four pages later we read that the nucleus "creeps about the cell like an amœba, and hence its movement is often called amœboid." The pictures of *Torula* and *Protococcus* on p. 39 will be a revelation to cytologists—we do not remember to have seen them before. This selection, and it is only a selection, is culled from the first forty pages, but is, we think, sufficient to

justify us in warning teachers and other school inspectors against the use of Mr. Browne's book.

We can hardly imagine a greater contrast than that between Mr. Browne's *Elements* and Dr. Ganong's *Laboratory Course in Plant Physiology*. They appeal to two very different classes of students, but while the one falls deplorably below the mark, and often tends to mislead the student and to lower the standard of botanical teaching, the other indicates a standard of excellence which we fear can rarely be attained in this country. We have already had occasion to comment on and commend Dr. Ganong's *Teaching Botanist* (Journ. Bot. 1899, p. 489), in which the author outlines a general course of botany arranged to give a synopsis of his subject to those who follow it no farther, or a foundation for higher work to those who do. This, the author suggests, will occupy the first year. For the second year he proposes a course in morphology with correlated ecology, including a study of the great groups of the plant world; and for the third year, a course in histology, cytology, and embryology. Then, for the fourth year, "a practicum in physiology, on the principle of that here outlined." Two things are evident—one, that a very considerable general training in the science is considered advisable before the student proceeds to work out experiments in plant physiology; and, secondly, that only in very special cases would an English student ever reach the last chapter in his botanical education. However, as the book is written for the benefit of the more highly favoured American student, we must not criticize it from our less fortunate standpoint. It may be a matter for discussion as to whether it is necessary to postpone to so late a period in the curriculum, individual exercises in plant physiology, but, at any rate, we are of the opinion that such a course should not be introduced at an early stage. The student should be well grounded in general botany, if he is to get the best advantage from a course in practical physiology.

Teachers who contemplate and have the means for carrying through such a course, will find in Dr. Ganong's book an excellent manual. It is divided into two parts. The first deals with methods of study, plans for workroom and greenhouse, and lists of the necessary equipment for the course which is then outlined in the second part. The equipment must necessarily involve a considerable outlay, but the author insists on the use, as far as possible, of simple home-made apparatus. The students are not doing research work,—or rather they are doing research work—but not for publication, merely to work out for themselves known facts and principles. The perfect quantitative accuracy which can only be attained in many cases by complex and very expensive apparatus, is not aimed at; the results sought are, in fact, rather qualitative than quantitative.

The method of work is one of question and answer. After a few general remarks in each section, a series of problems is set before the student, who himself works out the answer in the experiment, the description of which follows the statement of the question. The illustrations (there are thirty-five, and we wish there were

more) are from photographs of actual experiments, and will be found a help in the arrangement of the apparatus.

In Professor Green's book we have the completion of the second edition of the Manual of Botany which appeared about six years ago as a re-issue in a more modern form of the late Professor Bentley's Manual. The only important alteration, but that a somewhat extensive one, has been the re-writing of the section on the classification of seed-plants. The general arrangement is the same as in the edition of 1896; the author follows the sequence of orders adopted by Bentham and Hooker in the *Genera Plantarum*. But the characters of the orders which were previously set out in a concise diagnostic manner are now written in narrative form. It is suggested that this method makes the text more readable, which perhaps is the case, but it impresses the student less with the important characters of the group. We think it would have been better to have retained, in a shortened form, the diagnosis, and to have given as well a readable description of the order in which points of characteristic biological interest might also have been introduced. This would have taken more space, but we note that the volume is about twenty-five pages smaller than in the first edition, so that exigencies of space can hardly have come into consideration. Room might be made, if necessary, by omitting a large number of those less important orders, of which a student is never likely to see specimens, and which, moreover, are not necessary to an understanding of the main features of the system. The author has already gone some way in this direction by paying more attention to British orders, and introducing discussion on the morphology of the flower in particular ones; and we hope that in a subsequent edition he will proceed further.

It is practically impossible to get a text-book up to date, and it is extremely difficult to avoid slips where every page, as is especially the case in a systematic account, is crammed with facts; and we have not made it our business to hunt for examples of this kind. We must, however, remind Prof. Green that his account of the embryology of *Pinus*, and his figure 928, are out of date in certain details which have been the subject of recent work by more than one author. And we do not find any mention of the so-called secondary fertilization in Angiosperms, which, whatever it may mean, helps towards the understanding of the two parallel sets of developments which result from the union of the male cells with the female gametophyte.

Mr. Leavitt's handy little volume has been prepared to meet the demand for an elementary course in botany, for which more recent text-books are too comprehensive. It is an attempt to bring Asa Gray's well-known *Lessons in Botany* into line with more modern views on botanical teaching. The writer has separated the instructions for laboratory work from the descriptive text, so that a chapter with directions for practical work precedes the connected account of the subject of study. This method implies careful supervision by the teacher, or the student will achieve little else than the destruction of his material.

Chapters xi to xiv deal with the ordinary seed-plant, and form a good introduction to a knowledge of its morphology and the elementary facts of physiology. The chapter on Cryptogams is less successful; far too many examples are crowded into the time which will presumably be available in such a course. If Cryptogams are to be introduced at all, the advantage arising from their inclusion will depend on a careful comparative study of the details of their life-histories, and this can only be done satisfactorily for a limited number.

A. B. R.

Exkursionsflora von Europa. Von Franz Thonner. Berlin: R. Friedländer & Sohn. 1901. Small 8vo, pp. x (50), 355. Paper. Price 4 marks.

This well-printed work, which is designed as an "aid to the determination of the Genera of European Flowering-plants," is certainly cheap at the money; though, as it is written wholly in German, its circle of English readers is likely to be but small. Iceland and the Azores are included; the Ural and Caucasus ranges being taken as the eastern limit.

In nomenclature, and in the arrangement of genera and orders, Engler and Prantl's *Die Natürlichen Pflanzenfamilien* has been followed throughout; it is also the main source from which the generic descriptions have been borrowed—supplemented, however, by Bentham and Hooker's *Genera Plantarum*, De Candolle's *Prodromus*, Nyman's *Sylloge*, Wittstein's *Etymologisches Wörterbuch*; Pritzel and Jessen's *Deutsche Volksnamen der Pflanzen* and Garcke's *Flora von Deutschland* are taken as the standard authorities for "popular" names.

Part I. contains a key for the determination of the orders; Part II. deals in like manner with the genera. The arrangement adopted differs widely from that of our standard British floras and of Nyman's *Conspectus*; it will be sufficiently indicated by its main divisions:—Class I. *Coniferæ*; Class II. *Gnetales*; Class III. *Monocotyledoneæ* (*Typhaceæ* to *Orchidaceæ*); Class IV. *Dicotyledoneæ*; Sub-class A. *Archichlamydeæ* (*Salicaceæ* to *Cornaceæ*); Sub-class B. *Metachlamydeæ* (*Pirolaceæ* to *Compositæ*).

Both the ordinal and the generic characters appear to be very well treated; the descriptions are sufficiently full, without being at all cumbrous or involved.

As the title implies, the author's main object is to enable travellers in all parts of Europe to identify readily the genus of any plant that may be met with—useful enough in its way, no doubt, but quite insufficient for most botanists. What is really needed is a larger work, dealing with all the European species (*sensu latiori*) on much the same lines; however, the present contribution may be accepted as a valuable preliminary.

Probably the most helpful part of the book to British readers will be the explanation of technical terms (pp. 321–334), which

will save much time that would otherwise be spent in hunting through a dictionary.

A pretty full list of authors' names is appended, explaining the usual abbreviations; among these there seem to be one or two slips, *e.g.* "Ehrhardt" and "Marshal." Taken as a whole, this unpretentious volume deserves high praise.

E. S. M.

Botaniker Adressbuch. Herausgegeben von J. Dörfler. Zweite, neu bearbeitete und vermehrte Auflage. Wien, 1900. 8vo, cloth. pp. x, 356.

This second and enlarged (by nearly 60 pages) edition of a useful book will be welcomed by all who have much botanical correspondence. It is about six years since the first issue was published, and in that time many changes have occurred to render a new edition necessary. It is so well done that we regret it is not better; but it will never be as good as it easily might be until the compiler submits his proofs to some botanist in each country for correction and revision. We said this when reviewing the first edition (Journ. Bot. 1896, 237), and there is at least as much ground for criticism now as there was then. We can best make our meaning plain by examples from the section devoted to "Grossbritannien und Irland." In the list of places we find "Malborough, Devon, England," where there is a Natural History Society connected with "Malborough College." There is of course a Malborough in Devon, but Marlborough in Wilts is here meant. A more famous school fares no better:—"Windsor. Museum of the Eaton College." Under Kew the staff is given as in the former edition, but three out of the four officials mentioned have been changed, although their names and addresses remain as of old in Herr Dörfler's book.

The alphabetical list of botanists, which is remarkable for the number of names it includes—some of them with scanty claim to be classed as botanists and others with none—also needs revision. We may without doubt identify "Howell, E. C., Professor" with "Horrell, Ernest Charles." Miss A. L. Smith appears under "Lorrain-Smith," though we are not aware that she has succumbed to the charms of a hyphen. Sir John Lubbock should appear as "Avebury, Lord," although his earlier name might well be given on a cross-reference. The late Dr. George Mivart, even during his lifetime, could hardly be ranked as a botanist, nor should we have expected to find the Director of the Natural History Museum in the list. Mr. C. E. Salmon is not best known as a student of "micro-fungi"; and Mr. F. N. Williams has extended his range of observation beyond *Caryophyllaceæ*. The Editor of this Journal has cause for complaint in that his address is given as "Kensington Park Road"; the change of one letter will probably send many astray.

In view of the prefatory statement that the 9815 addresses

given are "all of them strictly correct," these slips are unfortunate. Nevertheless the book is indispensable to every public herbarium, and will be invaluable to private botanists throughout the world.

Some Continuations.

We have received continuations of various European floras which are making steady progress. The Abbé Coste's excellent *Flore de la France* has completed its first volume with the *Leguminosæ*, and the first part of vol. ii., including the *Rosaceæ* and a few smaller orders, has come to hand. We have before referred to the excellence of the small but well-drawn illustrations which are given of every species; these include critical forms—thus we have four of the *Alchemilla alpina* set, as well as *A. conjuncta* and four of the *A. vulgaris* section; there are fifty-four figures of Brambles and twenty-seven of Roses, both *Rubus* and *Rosa* being furnished with what appears to be a very careful key to the species. This work, including as it does "Corse et les contrées limitrophes," will, when completed, form an important addition to our European floras.

In this connection may be mentioned the *Flore de France* begun by MM. Rouy and Foucaud and continued by the former and M. E. G. Camus. No copy has reached us for notice; so we must content ourselves by saying that the seventh volume, bringing the enumeration to the end of *Umbelliferæ*, in which *Hederaceæ* and *Cornaceæ* are included, appeared last November. This is perhaps the most elaborate of all our current floras in the number of subspecies, forms, varieties, and hybrids, into which each species is divided.

The first volume of Dr. von Halácsy's *Conspectus Floræ Græcæ* ends with the *Dipsaceæ*. Each species has a brief but sufficient Latin description, followed by its geographical distribution in Greece; the literature of the subject has been carefully brought together, the name of each species being followed by numerous references and a certain amount of synonymy. An excellent and comprehensive index of about fifty pages, in which are included all the names mentioned in the book, completes the volume.

Of the very important *Synopsis der Mitteleuropäischen Flora*, conducted by Drs. Ascherson and Graebner, two volumes are now proceeding concurrently. That devoted to *Gramina* is rapidly approaching completion, the most recent part, issued last December, bringing the work down to *Hordeineæ*. The sixth volume, of which the second part was also issued in December, is so far devoted (save for *Platanus*, here included in the Rosales) to *Rosaceæ*. Some idea may be formed of the exhaustive nature of the work when it is stated that the thirty-eight species of *Rosa*—which genus is elaborated by Dr. R. Keller—occupy more than two hundred pages, most of these being in small print. The number of forms described at great length is almost overwhelming, and is calculated to deter any but the most resolute from entering upon a path in which the thorns

greatly outnumber the flowers. The fact that all the descriptions are in German detracts from the general usefulness of the work, and it is to be regretted that the convenience of the student was not considered when the arrangement of the book is planned—we have but one heading "*Rosa*" for all these pages, whereas it would have been quite easy to give at the top of each such information as would put the reader in possession of information which he must now hunt through several pages to find. There is a copious synonymy.

In connection with the continuation of floras, we venture once more to express a hope that means will be taken to bring to a conclusion the *Index Floræ Sinensis*, which, begun in 1886 and carried on with some regularity until 1891, appears to have fallen under the blight which for so many years impeded the continuation of the African floras undertaken at Kew. Since 1891, only two small parts, of sixty and eighty-two pages each, have been issued, the first in 1894, the second in 1899. It is obvious that this must result in the comparative uselessness of the work as a representation of the Chinese flora at any one period; at the present rate of delay, the end of the *Index* will be hopelessly out of harmony with the beginning. There may, of course, be adequate reason for the delay; but we trust that the Council of the Linnean Society, under whose auspices the work is issued, will do all that in them lies to secure its completion within a reasonable period.

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*ARTICLES IN JOURNALS.**

Botanical Gazette (24 Jan.). — R. A. Harper, 'Binucleate Cells in Hymenomycetes' (1 pl.). — J. F. Clark, 'Toxic properties of copper compounds.' — G. P. Clinton, '*Cladochytrium Alismatis*' (3 pl.). — J. C. Arthur, 'Clues to relationship among heterœcious Plant rusts.'—L. N. Gooding, 'New Rocky Mountain plants.'

Botanical Magazine (20 Dec.). — J. Matsumura, 'Japanese Rubi.' — Y. Uyeda, 'Ueber den 'Benikoji Pilz' aus Formosa' (1 pl.). — T. Kawakami, 'Forest trees of Etorofu in Kurile.' — T. Makino, 'Flora of Japan' (cont.).

Botaniska Notiser (15 Feb.). — T. Hedlund, 'Om frukten hos *Geranium bohemicum*.'—L. M. Neuman, 'Galeopsis Carthusianorum.'

Bot. Zeitung (15 Feb.).—L. Jost, 'Der Theorie der Verschiebung seitlicher Organe durch ihren gegenseitigen Druck.'

Bull. de l'Herb. Boissier (31 Jan.).—H. Solereder, 'Systematische Stellung von *Lebeckia ? retamoides*.' — A. Chabert, 'Les *Euphrasia* de la France.' — C. Meylan, '*Neckera Menziesii* & *N. turgida*.'— F. Stephani, 'Species Hepaticarum' (cont.).—G. Hegi, 'Das Obere Toesstal' (concl.).

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* The dates assigned to the numbers are those which appear on their covers or title-pages, but it must not always be inferred that this is the actual date of publication.

Bulletino della Società Botanica Italiana ("Nov.," received 21 Feb.). — L. Beissner, 'Conifères de Chine, recoltés par Père Joseph Giraldi dans Shen-si.' — N. Passerini, 'Sui tubercoli radicali della *Medicago sativa*' (3 pl.).—("Dec.," received 21 Feb.). A. Béguinot, 'Flora di Procida e di Vivara.'

Bull. Torrey Bot. Club (28 Jan.). — E. S. Salmon, 'Notes on *Erysiphaceæ*.'—A. P. Anderson, 'Canker growth on *Abies balsamea*' (2 pl.). — Id., '*Tilletia horrida* on *Oryza sativa*.' — R. J. Rennert, 'Seeds and seedlings of *Arisæma triphyllum* and *A. Dracontium*' (1 pl.).

Gardeners' Chronicle (15 Feb.). — *Crassula conjuncta* N. E. Br., sp. n.

Journal de Botanique ("Dec.," received 17 Feb.). — P. van Tieghem, *Epiblepharis*, gen. nov. (Luxembergieæ). — L. Guignard, 'La double fécondation chez les Renonculacées.' — C. Sauvageau, 'Les Sphacélariacées' (cont.). — P. Parmentier. 'Le pollen des Dialypétales' (concl.). — ("Jan.," received 17 Feb.). P. van Tieghem, 'Sur le genre *Beccarina*.' — E. Bescherelle, 'Mousses de la Guadeloupe et de la Martinique.' — N. Patouillard & P. Hariot, '*Bovista ammophila*.' — F. Guégnen, 'Anatomie du style et du stigmate des Phanérogames' (cont.).

New Phytologist (19 Feb.).—D. H. Scott, 'The old wood and the new.' — A. C. Seward, 'The so-called phloem of *Lepidodendron*.'— F. F. Blackman & A. G. Tansley, 'Classification of Green Algæ' (cont.).

Oesterr. Bot. Zeitschrift (Feb.).—F. Bubák, 'Einige Compositen bewohnende Puccinien' (*Jackya*, gen. nov.). — E. Zederbauer, 'Untersuchungen über Auflage und Entwicklung der Knospen an den Vorkeimen einiger Laubmoose' (3 pl.). — F. A. Tschermig, 'Die Algenvegetation an den Wasserrädern der Schiffsmühlen bei Wien.' — J. Velenovský, 'Neunter Nachtrag zur Flora von Bulgarien.'—E. Hackel, 'Neue Gräser.'—J. Freyn, 'Plantæ Karoanæ' (cont.).

Rhodora (Jan.).—H. Webster & F. H. Silsbee, *Volvaria*.—G. E. Davenport, 'New England Ferns' (cont.).—E. F. Williams, 'Lists of New England Plants.' — (Feb.). J. R. Churchill, 'Plants from Prince Edward Island.'

BOOK-NOTES, NEWS, &c.

At the meeting of the Linnean Society on Jan. 16th, Messrs. H. and J. Groves read a paper on "The Use of Linnean Specific Names." They showed that great diversity of practice existed in dealing with these names, and pointed out the necessity of arriving at some agreement as to their use as a first step towards uniformity in nomenclature. They grouped the Linnean specific names under the following heads:—(1) Those applied to distinct species fairly well understood in Linnæus's time, and still generally accepted.

(2) Those which are now considered to include two or more species, combined by Linnæus owing to either (*a*) the imperfect knowledge of the plants at the time, or (*b*) the different ideas then and now as to the extent of species. (3) Those about which there is more or less doubt as to their proper application, owing to (*a*) the descriptions being imperfect, (*b*) the synonymy (often the most important part of the description) being contradictory, or (*c*) confusion due to changes made by Linnæus himself after publication. After discussing the various methods adopted and the difficulties connected with each, Messrs. Groves recommended that in doubtful cases, so far as possible, the description in conjunction with the reference to earlier authors should be relied on, always construing the species liberally, and that when the specimens in the Linnean herbarium or amendments in the second edition of *Species Plantarum* are at variance with this conception of the species, they should be disregarded. As regards group 2, they recommended that the name should be retained for the type if specified, or, if not, to the species which may be most fairly regarded as the type, and in the absence of such to the residuary species after others had been cut off; and, as regards group 3, that unless the evidence is hopelessly vague, or contradictory, the names should be retained for the species for which the weight of evidence points to their having been intended.

At the meeting of the same Society on Feb. 6th, Messrs. H. and J. Groves exhibited a series of British hybrid Batrachian Ranunculi, including *R. peltatus* × *Lenormandi* (*R. Hiltoni* H. & J. Groves), *R. Baudotii* × *Drouetii*, *R. Baudotii* × *heterophyllus*, and *R. peltatus* × *trichophyllus*, together with specimens of their supposed parents. They pointed out that the hybrids were easily characterized by (1) being intermediate in appearance between the two parents, having some of the distinctive characters of each, but with a more vigorous vegetative growth, and (2) by the fruit being mostly abortive and the peduncles not becoming recurved.

At the same meeting Mr. Francis Darwin read a paper "On a Method of investigating the Gravitational Sensitiveness of the Root-tip," showing the apparatus used, and lantern-slides of seedlings under experiment. Confining himself to the modern development of the question, the author remarked that the observations of Czapek and of Pfeffer having been contradicted by Wachtel, it had become desirable to confirm these observations by employing a different method. The apparatus used consisted of a counterbalanced lever 53 cm. long, able to turn in any direction by being mounted on knife-edges. Seedlings of the bean and the pea were employed, and glass tubes, straws, and dandelion scape were in turn used to contain the root-tip, and by the aid of certain mechanical appliances, to prevent the root slipping out of the tube. The tip being fixed, the remaining part of the root and the hypocotyl became curved in varying degrees, due to the continued stimulation of the root-tip. The result has been confirmation of the observations made both by Czapek and by Pfeffer.

Dr. D. H. Scott on the same occasion gave an account (illustrated by lantern-slides) of "An Extinct Family of Ferns"—the *Botryopterideæ*, our knowledge of which is primarily due to the researches of M. Renault. The vegetative organs and sporangia of the type-genus *Botryopteris* were described, and two British Palæozoic species, *B. hirsuta* Will. and *B. ramosa* Will., were added to the genus on the ground of their anatomical structure. The genus *Zygopteris*, also known with some degree of completeness, was next dealt with, and the structure of the British species *Z. Grayi* Will. described in some detail. Reasons were given for including other genera, such as *Anachoropteris*, *Asterochlæna*, and *Tubicaulis*, in the family, while a close connection with *Diplolabis* and *Corynepteris* was also regarded as probable. The affinities of the group were discussed in conclusion, points of agreement with *Hymenophyllaceæ*, *Osmundaceæ*, *Ophioglossaceæ*, and other families of Ferns being pointed out. Heterospory, believed by M. Renault to exist in *Botryopteris* and *Zygopteris*, was not regarded as established, and affinities were sought rather among homosporous Filices.

Miss A. Lorrain Smith publishes in the *Journal of the Royal Microscopical Society* an interesting paper on "Fungi found on farm seeds when tested for germination." The paper, which is accompanied by an excellent plate, contains the description of a new genus, *Stemphyliopsis* and of two new species—*Langloisula heterospora* and *Rhizopus umbellatus*: specimens and slides of these have been placed in the National Herbarium.

It is not from a wish to find fault that we once more refer to the serious misprints in the *Botanisches Centralblatt*, but in the hope that demonstration of the need for it may result in increased care; carried on at present, the usefulness of the magazine is seriously marred by careless proof-reading. In no. 5, for example, Mr. J. M. Wood is entered as "Medley, Wood J." and indexed under "Medley," and *tugulensis* is printed "Augulensis"; while an article on "The Snow Plant," by Pauline Kaufman, is entered as "Kaufman, C., The sward plants." In no. 7, the only English papers referred to are attributed respectively to "Britton, J." and "Spencer Le Moore, M[archant]," the latter author being indexed under "Spencer." We are unable at present to discover what rules, if any, regulate the inclusion of papers or the length of the notices, many of which are extremely disproportionate. There does not appear to be any system as to the dates of the papers quoted; thus no. 2 cites contributions from pp. 289–389 of this Journal for 1901, while one of the papers in no. 7 is from pp. 140–143. We trust that an excellent scheme is not going to be frustrated by inadequate execution.

Gustavus A. Ornano St. Brody, who died at Wallingford, Berks, on the 22nd of last November, was the author of a small descriptive *Flora of Weston-super-Mare*, published in 1856, in connection with the botanical lecture-classes he held in that town; it contains some interesting but not always accurate records. Dr. St. Brody was born in France in 1828, but appears to have spent the chief part of

his life in Great Britain, as a teacher of science and of languages. He took the degree of B.-ès-Sc. at the Sorbonne, and also became M.A. and Ph.D. of Göttingen. In 1856 he advertised a Flora of Somersetshire as preparing for publication, but the work was never issued; the MS. is stated to be with his herbarium, which was sold to the Gloucester Museum in 1870. His discovery of *Botrychium matricariæfolium* A. Br. in 1887 at Stevenston, in Ayrshire, confirmation of which is desirable, is noticed in this Journal in 1898, p. 291, where the specimen is figured (t. 388 B). He was a Fellow of the Linnean Society from 1863 to 1872, and for many years a member of the Botanical Exchange Club.

The Rev. W. H. Painter has issued in a cloth cover, with title-page and index, his two papers forming a Supplement to his Flora of Derbyshire which were published in *The Naturalist* for 1899, with a third, which appeared in January last. The sheets are 'pulls' from the periodical, not even the paging being altered: this runs from p. 177 to p. 272, and then from p. 5 to p. 12. The most important item is the list of Derbyshire mosses; the number of corrections, both to the Flora and to the earlier part of the Supplement, is considerable. The price of the work—4s.—strikes us as somewhat high; it is published by Messrs. Chorley and Pickersgill, Leeds, and will be useful when a more adequate flora of the county is undertaken.

We have received the first part of the welcome Supplement to the *Index Kewensis*, which we hope to notice at an early date. It consists of 120 pages, and goes up to *Cymbidium*. The work bears neither date, name of publisher, nor place of publication.

Prof. Percival has issued the sets of specimens illustrating the chief species, races, and varieties of European Cereals, to which we referred on p. 435 of last year's volume. A descriptive pamphlet accompanies the specimens, which appear to be well selected.

The second number (December) of the *Annals of the Royal Botanic Gardens, Peradeniya*, contains an interesting account of "The Botany of the Maldive Islands," by Messrs. J. C. Willis and J. S. Gardiner. It includes a long list of Maldivian plant-names.

We have received the first part of *Contributiuni la Flora Ceahlaului* (alpine and subalpine region), by Messrs. Z. C. Pantu and A. Procopianu-Procopovici. It is reprinted from the *Bulletin de l'Herbier de l'Institut botanique de Bucarest*, of which the first number appeared last September.

The Southern California Academy of Sciences has begun to issue a small monthly *Bulletin*. The first number of twelve pages contains a figure and description by Dr. A. Davidson of *Zauschneria arizonica*, sp. n.; in the second (eight pages) Mr. S. B. Parish figures and describes *Aster Greatai*, sp. n.

We understand that no action will be taken with regard to the inquiry of the Botanical Work Committee which we summarized in last year's Journal, pp. 305–315.

A CATALOGUE

OF

THE BRITISH MARINE ALGÆ

BEING

A LIST OF ALL THE SPECIES OF SEAWEEDS KNOWN TO OCCUR

ON THE SHORES OF THE BRITISH ISLANDS,

WITH THE LOCALITIES WHERE THEY ARE FOUND.

BY

E. A. L. BATTERS, B.A., LL.B., F.L.S., &c.,

Barrister-at-Law of Lincoln's Inn.

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1902.

A CATALOGUE

OF THE

BRITISH MARINE ALGÆ.

BY

E. A. L. BATTERS, LL.B., B.A., F.L.S.

More than ten years have now elapsed since the appearance of the "Revised List" by Mr. Holmes and myself, which still remains the most recent catalogue of the British Marine Algæ. In the meantime many additions have been made to our Marine Flora, and very numerous changes both in nomenclature and classification have been rendered necessary by our increased knowledge of the subject. I hope, therefore, that a catalogue incorporating all the more recent alterations may not prove wholly unacceptable to algologists.

I have attempted to roughly indicate the distribution of the species on the British coasts, and with that object in view I have examined many important collections, both public and private, more especially those of Buddle, Petiver, Uvedale, Ed. Forster, Rev. Hugh Davies, the remnants of Hudson's herbarium, and the general British Collection in the British Museum; those of Bishop Goodenough, Dawson Turner, Sir W. Hooker, Capt. Carmichael, and others at Kew; those of Stackhouse, Mrs. Griffiths, Dr. Cocks, and a duplicate set of Prof. W. H. Harvey's British Marine Algæ in the possession of the Linnean Society; the five fasciculi of Mrs. Wyatt's "Algæ Danmonienses," the ten of Mr. Holmes's valuable "Algæ Britannicæ Rariores Exsiccatæ," and many private collections, in addition to those mentioned in the introduction to the "Revised List" by Mr. Holmes and myself, the Pollexfen herbarium, and the beautiful series of microscopic preparations of British Marine Algæ made by the late Mr. T. H. Buffham, now forming part of my own extensive collection. I have also consulted the earlier works dealing with the subject, many local Floras, and the periodical literature up to the end of the year 1900. I am also much indebted to Mr. E. M. Holmes for much valuable information on this subject, and for allowing me to inspect many valuable specimens from his unrivalled collection of our native seaweeds. The data, however, are still so few, that only a very imperfect survey can be made; many species being, undoubtedly, much more widely distributed on our coasts than would appear to be the case from an

inspection of the list of their recorded stations. This is especially the case with the *Myxophyceæ*, the microscopic species, and those which were formerly regarded as merely varieties of some other species.

With regard to the nomenclature, I have tried to bring it more into accord with that adopted by all algologists on the Continent of Europe and in the United States of America. I have introduced very few changes on my own authority, and only those absolutely demanded by the rules as to priority of publication. It may not be out of place to call attention here to the careless way in which the earlier authors quoted the works of their predecessors; Goodenough and Woodward, Turner and Stackhouse, for instance, refer to the second edition of Hudson's *Flora Anglica* as if it were a reprint of the one issued in 1762, which is very far from being the case, many species making their first appearance in the edition of 1778; again, they refer constantly to Withering's *Botanical Arrangement*, without stating to which of the three editions of that work, which had then appeared, they refer; on the other hand, Stackhouse's *Nereis* is treated as if none of it had appeared before 1801 (the date of the completed work), whereas in reality it was published in three parts, which were respectively issued in 1795, 1797, and 1801. Similar instances might be given to almost any extent. Later authors followed the lead of the earlier ones, and now, when date of publication is of such importance in matters of nomenclature, the practice has given rise to much confusion.

Order MYXOPHYCEÆ Stizenb.

Family I. Coccogoneæ Thur.

Tribe I. Chroococcaceæ Rabenh.

Gen. 1. Chroococcus Näg.

C. turgidus Näg. Norfolk coast (Yarmouth). Probably common.

Gen. 2. Aphanocapsa Näg.

A. marina Hansg. Coasts of Northumberland (Berwick), Dorset (Swanage), and Essex (Clacton). Probably common.

Gen. 3. Gloeocapsa Näg.

G. crepidinum Thur. Coasts of Yorkshire (Scarborough), Northumberland (Berwick), Essex (Southend, Clacton), Sussex (Bognor, Worthing), and Dorset (Weymouth); Wales (Point of Ayr); Scotland (S. Connel, Argyleshire). Probably common.

Gen. 4. Oncobyrsa Ag.

O. marina Rabenh. Coast of Dorset (Swanage). Rare.

Gen. 5. Anacystis Menegh.

A. parasitica Kütz. (= *Polycystis pallida* Holm. & Batt. Rev. List). Coasts of Northumberland (Berwick), Dorset (Weymouth), and Devon (Sidmouth). Probably common.

Gen. 6. Aphanothece Näg.

A. pallida Rebenh. Dorset coast (Weymouth). Probably common.

Gen. 7. Merismopedia Meyen.

M. glauca Kütz. S.W. Scotland (Cumbrae). Probably common.

Tribe II. Chamæsiphonaceæ Borzi.

Gen. 8. Dermocarpa Crn.

D. Schousbœi Born. Coasts of Northumberland (Berwick), Yorkshire (Scarborough), Norfolk (Yarmouth), and Somerset (Minehead); N. Wales (Puffin I.; Hilbre I.); S.W. Scotland (Cumbrae; S. Connel, Argyleshire). Not uncommon.

D. Leibleiniæ Born. Devonshire coast (Teignmouth); S.W. Scotland (Cumbrae); Channel Islands (Jersey). Rare.

D. violacea Crn. Coasts of Northumberland (Berwick) and Kent (Deal); S. Scotland (Cumbrae, Oban, Dunbar). Rather rare.

D. prasina Bornet. Coast of England and S. Scotland; Channel Islands. Common.—*β olivacea* Holm. & Batt. S. England.

D. rosea Batt. Coast of Northumberland (Berwick); S.E. Scotland (Dunbar). Rare.

D. incrustans Batt. Northumberland coast (Berwick); Sussex (Hastings); S.E. Scotland (Arbroath). Not uncommon.

Gen. 9. Pleurocapsa Thur.

P. fuliginosa Hauck. Coasts of Northumberland (Berwick) and Dorset (Weymouth). Rare.

P. amethystea Rosenv. Coast of Wales (Puffin Island); Channel Islands (Guernsey). Rare.

Gen. 10. Entophysalis Kütz.

E. granulosa Kütz. Coast of Sussex (Worthing). Rare.

Gen. 11. Hyella Bornet & Flah.

H. cæspitosa Born. & Flah. Coasts of Essex (Clacton, Leigh), Dorset (Weymouth), and Devon (Teignmouth, Plymouth); Wales (Hilbre Island); S.W. Scotland (Cumbrae, Gare Loch, &c.); Ireland (Belfast Lough); Channel Islands (Guernsey). Common.—*β nitida* Batt. (= *H. voluticola* Chodat). Dredged in Plymouth Sound. Coast of Wales. Rare.

Gen. 12. Chamæsiphon A. Br.

C. marinus Wille. Coast of Dorset (Swanage). Probably common.

Family II. Hormogoneæ Thur.

Subfam. Homocysteæ Born. & Flah.

Tribe I. Lyngbyeæ Gom.

Subtribe Spirulinoideæ Gom.

Gen. 13. Spirulina Turpin.

S. major Kütz. (= *S. pseudotenuissima* Batt. Alg. Berw. pl. vii. f. 4, et *S. Hutchinsiæ* Harv., non Kütz.). Coasts of Northumberland (Berwick) and Wales (Point of Ayr); S.W. Scotland (Cumbrae). Rare.

S. versicolor Cohn. *β laxa* Gom. Coast of Devonshire (Plymouth). Rare.

S. subsalsa Œrsted (= *S. tenuissima* Kütz.). Coasts of England, Wales, and S. Scotland. Not uncommon.—*β oceanica* Gom. (= *S. oceanica* Crn.). Coasts of Dorset (Weymouth) and Norfolk (Cley). Rare.

Subtribe II. Oscillarioideæ Gom.

Gen. 14. Oscillatoria Vaucher.

O. Bonnemaisonii Crn. (= *Oscillaria Colubrina* Thur. et *O. intermedia* Crn.). S.E. Scotland (near Berwick). Rare.

O. margaritifera Kütz. (= *O. insignis* Thw.). Shirehampton, near Bristol, Saltash, and Cumbrae. Probably not uncommon.

O. nigroviridis Thw. Shirehampton, Cumbrae, and Berwick. Probably not uncommon.

O. Corallinæ Gom. (= *O. littoralis* Carm.; *O. capucina* Holm. Fasc. no. 69; and *Lyngbya gracilis* Batt. in Grevillea, Dec. 1893, non Rabenh.). Coasts of Dorset (Weymouth) and Essex (Harwich); S.W. Scotland (Appin); Channel Islands (Guernsey). Common.

O. amphibia Ag. (= *O. infectoria* Tassi). Coast of Northumberland (Berwick). Rare.

O. subuliformis Thw. Shirehampton; coasts of Northumberland (Berwick) and S.W. Scotland (Cumbrae). Rare.

O. lætevirens Crn. Coast of Northumberland (Berwick).

O. formosa Bory (= *O. tenuis* Holm. & Batt. Rev. List). Only recorded from the Northumberland coast (Berwick).

O. brevis Kütz. *β neapolitana* Gom. S.W. Scotland (Cumbrae). Rare.

O. rosea Batt. (*Oscillaria rosea* Crn.). Coast of Devon (Plymouth). Dredged. Rare.

Gen. 15. Phormidium Kütz.

P. fragile Gom. Coasts of Wales (Point of Ayr) and Northumberland (Holy Island). Rare.

P. tenue Gom. Northumberland coast (Berwick); Wales (Point of Ayr). Rare.

P. corium Gom. Coasts of Essex (Burnham) and Dorset (Swanage). Not uncommon.

P. papyraceum Gom. (= *Oscillatoria spiralis* Carm.). S.W. coast of Scotland (Appin, Cumbrae); Sussex (Brighton); Cornwall (Penzance, Saltash, &c.); N. Wales (Anglesea, Point of Ayr). Not uncommon.

P. ambiguum Gom. S.W. coast of Scotland (Cumbrae).

P. uncinatum Gom. Northumberland coast (Berwick).

P. autumnale Gom. (= *P. antliarum* Gom. in Holm. & Batt. Rev. List). Coasts of Northumberland (Berwick), Cornwall (Padstow, Falmouth), and Dorset (Weymouth). Not uncommon.

P. Ectocarpi Gom. (= *P. persicinum* Batt., non Gom.). S.W. Scotland (Cumbrae) and Devonshire (Plymouth). Rare.

Gen. 16. Lyngbya Ag.

Subgenus Leibleinia Gom.

L. Agardhii Gom. Coasts of Kent (Margate) and Devon (Plymouth). Rare.

L. Meneghiniana Gom. S. Scotland (Caroline Park, near Edinburgh; Cumbrae).

Subgenus Eulyngbya Gom.

L. æstuarii Liebm. f. *ferruginea* Gom. (= *L. ferruginea* Ag. et *L. luteofusca* Holmes in Grevillea, 1882, non Kütz.). Coasts of Dorset (Swanage, Poole), Sussex (Worthing), and Northumberland (Berwick); Scotland (Appin, Cumbrae, Aberdeen, Earlsferry, Fifeshire). Not uncommon.—f. *limicola* Gom. Coast of Wales (Point of Ayr, Flintshire). — f. *natans* Gom. Point of Ayr, Flintshire.—f. *symplocoidea* Gom. Point of Ayr, Flintshire. —f. *æruginea* Gom. Point of Ayr, Flintshire.—f. *spectabilis* Gom. (= *L. spectabilis* Thur.). Point of Ayr, Flintshire.

L. majuscula Harv. Coasts of Devon (Torquay, Sidmouth, Ilfracombe, Plymouth), Cornwall (Mounts Bay, Mount Edgcumbe), Dorset (Weymouth), and Northumberland (Holy Island); Scotland (Hunterston, Girvan, Orkney Islands); Ireland (Belfast, Bantry, Portrush); Channel Islands (Jersey, Guernsey, Alderney). Not uncommon.—f. *crispa* Holm. & Batt. With the type.

L. semiplena J. Ag. (= *L. confervoides* Batt. in Grevillea, non Ag.). Coasts of Norfolk (Yarmouth), Essex (Southend), and Dorset (Weymouth, Swanage); N. Wales (Point of Ayr); Channel Islands (Guernsey). Not uncommon.

L. lutea Gom. Coast of Wales (Puffin Island); Scotland (Cumbrae). Rare.

L. Rivulariarum Gom. (within the sheaths of *Microcoleus chthonoplastes*). Dorset coast (Swanage, Studland); Scotland (Cumbrae). Rare.

Gen. 17. Symploca Kütz.

S. hydnoides Kütz. *α genuina* Gom. (= *Calothrix semiplena* Harv. et *S. Harveyi* Le Jol.). Coasts of Devon (Sidmouth, Torquay), Cornwall (Mousehole, Fowey), Dorset (Weymouth, Swanage), and Suffolk (Felixstowe); N. Wales (Puffin Island); Scotland (Dunbar, Earlsferry, Kingcraig, Arran); Ireland (Kilkee); Channel Islands (Guernsey). — f. *fasciculata* Gom. (= *S. fasciculata* Kütz.). Dorset coast (Weymouth); Northumberland (Berwick); Scotland (Cumbrae). Not uncommon.

S. atlantica Gom. Coast of Wales (Ferryside, Carmarthen); Dorset (Studland). Rare. — *β purpurea* Batt. Devon (Mouth of the Yealm).

Gen. 18. Plectonema Thur.

P. Nostocorum Born. (within the sheaths of *Rivularia bullata*, *Schizothrix vaginata*, and *Dichothrix gypsophila*). Coasts of Devonshire (Torquay, Sidmouth) and Dorset (Weymouth, Chapman's Pool); Scotland (Cumbrae). Rare.

P. terebrans Born. & Flah. (within the chalky shells of several species of molluscs). Coasts of Dorset (Weymouth, Swanage), Devonshire (Plymouth, mouth of the Yealm), and Northumberland (Berwick); Scotland (Cumbrae); Ireland (Belfast Lough). Not uncommon.

P. Battersii Gom. Northumberland coast (Berwick). Probably not uncommon.

P. norvegicum Gom. Coasts of Essex (Clacton) and Dorset (Swanage). Probably not uncommon.

Tribe II. Vaginarieæ Gom.

Gen. 19. Microcoleus Desmaz.

M. chthonoplastes Thur. (= *M. anguiformis*). Coasts of Wales (Dolgelly, Point of Ayr), Devon (Sidmouth), Cornwall (Looe), Dorset (Studland), and Northumberland (Berwick, Holy Island); Scotland (Firth of Clyde in several places, Montrose, Dunbar). Not uncommon.

M. tenerrimus Gom. Coast of Devon (Torquay).

Gen. 20. Hydrocoleum Kütz.

H. lyngbyaceum Kütz. *α genuina* Gom. Coasts of Northumberland (Berwick), Dorset (Weymouth), and Devon (Sidmouth). Rare.—*β rupestre* Kütz. (*Microcoleus nigrescens* Thur.). Coasts of Northumberland (Berwick) and Kent (Folkestone). Rare.

H. glutinosum Gom. (= *Oscillaria percursa β marina* Kütz.). Coast of Northumberland (Berwick). Rare.

Gen. 21. Schizothrix Kütz.

S. Cresswellii Harv. Coast of Devon (Sidmouth). Very rare.

S. lardacea Gom. Coast of Devon (Paignton). Rare.

S. vaginata Gom. Coast of Devon (Sidmouth); Scotland (Cumbrae).

Subfamily II. Heterocysteæ Hansg.

Tribe 1. Rivulariaceæ Rabenh.

Subtribe Leptochæteæ Borzi.

Gen. 22. Amphithrix.

A. violacea Born. & Flah. Coast of Scotland (*fide* Rabenhorst).

Subtribe Mastichotricheæ Kütz.

Gen. 23. Calothrix Ag.

C. confervicola Ag. Common on the shores of England, Wales, and S. Scotland; Ireland; Channel Islands.—*β purpurea* Born. & Flah. Coasts of Norfolk (Yarmouth) and Sussex (Bognor). Rare.—*γ Zostericola* Crn. Coast of Dorset (Weymouth, Swanage).

C. consociata Born. & Flah. Coast of Norfolk (Cley). Rare.

C. scopulorum Ag. Not uncommon on the coasts of England, Scotland, and Ireland; Channel Islands (Guernsey).

C. Contarenii Born. & Flah. Coast of Dorset (Weymouth). Rare.

C. pulvinata Ag. (= *C. hydnoides* Harv., *C. pannosa* Harv., and *C. cæspitula* Harv.). Not uncommon on the shores of England, Scotland, Ireland, and the Channel Islands.

C. parasitica Thur. Coasts of Dorset (Portland, Swanage) and Cornwall (Porth Cressa, Scilly). Rare.

C. æruginea Thur. Coasts of Devon (Tor Abbey, Sidmouth), Cornwall (Padstow), Dorset (Swanage), and Northumberland (Berwick); Scotland (Earlsferry, Fife). Rare.

C. crustacea Thur. Coasts of Devon (Salcombe, Sidmouth, Torquay), Dorset (Swanage), and Northumberland (Berwick). Not uncommon.

C. fasciculata Ag. Coasts of Dorset (Swanage) and Northumberland (Berwick, Holy Island); Scotland (Cumbrae, Lismore, Elie, Fife); Ireland (Miltown Malbay).

C. vivipara Harv. *Nereis Boreali-Americana*, iii. p. 106 (1858). Arbroath, May, 1893; J. Jack.

Gen. 24. Dichothrix Zan.

D. gypsophila Born. & Flah. in Ann. Sc. Nat. vii. sér. Bot. vol. iii. p. 377. On rocks near high-water mark. Weymouth, Aug. 1900; and Sidmouth, Aug. 1901; E. A. B.

Subtribe Rivulariaceæ Kütz.

Gen. 25. Isactis Thur.

I. plana Thur. (= *Rivularia plana* Harv.). Coasts of Devonshire (Sidmouth), Hants (Ventnor, I. W.), Sussex (Bognor), Essex (Blackwater), Dorset (Swanage, Weymouth), and Northumberland (Berwick). Not uncommon. — *β fissurata* Born. & Flah. Coast of Northumberland (Berwick).

Gen. 26. Rivularia Ag.

R. Biasolettiana Menegh. (= *Schizosiphon Warreniæ* Casp.). Coasts of Devon (Sidmouth, Plymouth), Cornwall (Falmouth, Penzance, Wadebridge), Yorkshire (Scarborough), Northumberland (Berwick), and Dorset (Weymouth); N. Wales (Hilbre I., Point of Ayr); Scotland (Cumbrae); Ireland (Torr Head, Antrim). Not uncommon.

R. atra Roth. Common on the shores of England, Scotland, Ireland, and the Channel Islands. — *β hemisphærica* Born. & Flah. With the type. — *γ confluens* Farlow. Coasts of Devon (Sidmouth) and Northumberland (Berwick). Rather rare.

R. nitida Ag. (= *R. plicata* Carm.). Coasts of Devon (Torbay) and Cornwall (Mounts Bay, Saltash, Trevone); Scotland (Appin, Ballantrae, Eyemouth); Ireland (Innischerig Island, Malby). Not uncommon.

R. bullata Berk. (= *R. nitida* Desmaz.). Coasts of Devon (Torquay, &c.) and Cornwall (Looe, Fowey, St. Minver, Mounts Bay); Ireland, South and West; Channel Islands (Guernsey). Rare.

R. mesenterica Thur. (= *R. polyotis* Holm. & Batt. Rev. List, non Born. & Flah.). Coast of Devon (Torquay). Rare.

R. australis Harv. Coast of Devon (Torquay). Rare.

Gen. 27. Brachytrichia Zan.

B. Balani Born. & Flah. Coasts of Dorset (Bournemouth, Swanage) and Devon (Sidmouth). Very rare.

Tribe II. Sirosiphoniaceæ Rabenh.

Gen. 28. Mastigocoleus Lagerh.

M. testarum Lagerh. Not uncommon on the shores of England and S. Scotland; Ireland (Belfast Lough); Channel Islands (Guernsey).

Tribe III. Scytonemaceæ Rabenh.

Gen. 29. Microchæte Thur.

M. grisea Thur. Coasts of Dorset (Weymouth) and Northumberland (Berwick). Rare.

M. æruginea Batt. Coast of Northumberland (Berwick).

Tribe IV. Nostoceæ Kütz.

Gen. 30. Nostoc Vaucher.

N. entophytum Born. & Flah. S.W. Scotland (Cumbrae). Rare.

N. Linckia Born. (= *Monormia intricata* Berk.). Coasts of Gloucester (Shirehampton, near Bristol), Kent (Gravesend), and Norfolk (Brancaster); S.W. Scotland (Cumbrae). Rare.

Gen. 31. Anabæna Bory.

A. variabilis Kütz. (= *Sphærozyga Thwaitesii* Harv.). Coasts of Gloucester (Shirehampton, near Bristol), Somerset (Porbury), Cornwall (Penzance), and Essex (Harwich); Wales (Dolgelly); S.W. Scotland (Cumbrae). Probably not uncommon.

A. torulosa Lagerh. (= *Sphærozyga Carmichaelii* Harv.). Coasts of Gloucester (Shirehampton, near Bristol), Sussex (Brighton), Norfolk (Cley), and Northumberland (Berwick); Wales (Menai Straits, Barmouth, Point of Ayr, Anglesea, Dolgelly); S.W. Scotland (Appin). Not uncommon.

Species inquirendæ.

A. Broomei Batt. (= *S. Broomei* Thw.). Coast of Gloucester (Shirehampton, near Bristol).

A. Berkeleyana Batt. (= *S. Berkeleyana* Thw.). Coast of Gloucester (Shirehampton).

Gen. 32. Nodularia Mert.

N. Harveyana Thur. (= *Spermosira Harveyana* Thw.). Coasts of Gloucester (Shirehampton) and Northumberland (Berwick); Wales (Point of Ayr). Rare.

N. spumigena Mert. *β litorea* Born. & Flah. (= *Spermosira litorea* Kütz.). Coast of Gloucester (Shirehampton); Wales (Barmouth, Dolgelly); S.W. Scotland (Cumbrae). Rare.

Order CHLOROSPERMEÆ Harv.

Suborder Protococcinæ Holm. & Batt.

Fam. Protococcaceæ Menegh.

Gen. 33. Chlorochytrium Cohn.

C. immersum Massee. Coast of Yorkshire (Scarborough).

C. inclusum Kjellm. Coasts of England, Wales, and S. Scotland. Common.

C. Cohnii Wright (= *Chlorocystis Cohnii* Rke.). Ireland (Howth, near Dublin); Essex (Harwich); Dorset (Swanage); Devon (Teignmouth); Wales (Bangor). Not uncommon.

C. dermatocolax Rke. Coast of Northumberland (Berwick); Wales (Bangor); S.W. Scotland (Cumbrae). Rare.

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THE JOURNAL OF BOTANY

BRITISH AND FOREIGN

EDITED BY

JAMES BRITTEN, K.S.G., F.L.S.

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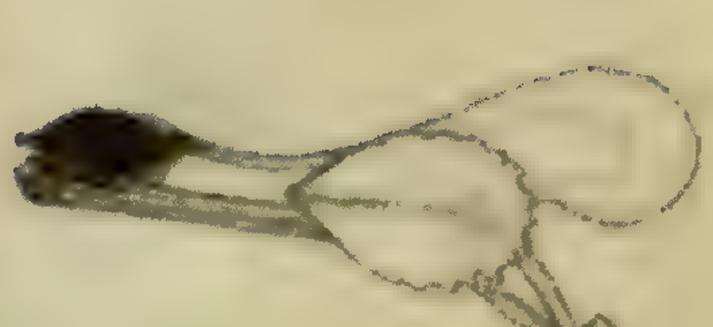

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H. W. Pugsley del.

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BRITISH CAPREOLATE FUMARIAS.

THE BRITISH CAPREOLATE FUMITORIES.

By H. W. Pugsley, B.A.

(Plate 436.)

In the summer of 1898, while enjoying a holiday in Devonshire, I collected a number of Fumitories, which upon my return to town I endeavoured to name (being dissatisfied with the result of a reference to my English Floras) by examination with the specimens in the herbarium of the British Museum. I found, somewhat to my surprise, that the British collection there, to which I had recourse, did not help me, but, on the contrary, served only to augment my confusion; and, after vainly spending some time in the attempt to find the correct names of my plants, I was induced to go back to the original descriptions of the different species, and, as far as possible, to the type specimens sent out by their authors.

As the result of these researches—in which I have been assisted by Mr. E. G. Baker and by Mr. C. R. P. Andrews, who, unfortunately for British botany, has now left this country—I find that great discrepancies exist between the British and the continental views of the genus, especially in the so-called "capreolate" section, with which alone I propose to deal for the present. These discrepancies are due to our neglect of the genus in recent years, and appear to have originated from errors on the part of one or two of our botanists who can only have fallen into them through an imperfect acquaintance with the living plants, and, perhaps, overmuch zeal in identifying British specimens with forms already described abroad.

As is the case with many other weeds of cultivation, the Fumitories, and particularly the "Capreolatæ," vary greatly according to the conditions under which they grow. Speaking generally, examples seen early in the year have larger and more highly coloured flowers than later ones found during the hot weather of summer or in the autumn. Among the plants that grow in open, breezy fallows a short and branchy habit prevails, with spare foliage and flowers finer and deeper in hue than those of the same species found on the lax, straggling plants with ample leaves that flourish on sheltered hedgebanks or shady corners of the fields. Manure-heaps and stone walls, too, will often furnish abnormal specimens. Then, chiefly in *F. Boræi* and *F. confusa*, the flowers of the first few racemes are frequently larger and darker than those that succeed them, and at times the difference between the earliest and latest flowers on the same plant is remarkable, in dry weather particularly, the latter being less than half the size of the former and almost without any distinctive form or coloration. In these cases, in order to identify the species, it becomes necessary to consider primarily the fruit and the sepals, which in all conditions, both wild and under cultivation, seem to uniformly maintain their characteristic features.

A further practical difficulty is that characters which are unmistakable in the living plants may become very obscure indeed in the Fumitories of the herbarium. This applies especially to the base or "neck" of the fruit; to the form of the outer petals; and sometimes to the curving of the pedicels. It unfortunately happens, too, that in the dried plants the flowers and fruits very readily fall away, and this to such an extent that in some of the older type-specimens that I have seen, no vestige either of any part of the flower or of the fruit remains.

Having thus briefly pointed out what seem to be the chief difficulties in examining these neglected plants, I will endeavour to indicate and account for some of the differences between our views of the various species and those of our neighbours across the Channel.

In the ninth edition of the *London Catalogue* the Capreolate Fumitories stand as follows, *viz.*:—

1. *Fumaria pallidiflora* Jordan.
2. *F. Boræi* Jord.
3. *F. confusa* Jord.
4. *F. muralis* Sonder.

This classification, which seems to be based on a paper read by Professor Babington before the Linnean Society in 1859, agrees with that in Syme's *English Botany*, edition 3, with the editions of Babington's *Manual* subsequent to 1862, and with the latest edition of Hooker's *Student's Flora*, excepting that in *English Botany* the forms are all called subspecies of *F. capreolata* L., while in the two latter works *F. Boræi* is reduced to the rank of a variety of *F. pallidiflora* (which Hooker calls *F. capreolata* L.), and in the *Student's Flora* *F. confusa* and *F. muralis* are treated as subspecies only.

Turning to the arrangement given by recent continental authors, I find in Nicotra's monograph, 1897:—

Sect. 1. Capreolatæ.

(1.) *F. capreolata* L. *β flavescens* (= *F. pallidiflora* Jord.).

. . . . . .

(3.) *F. muralis* Sond.
F. muralis Sond. *β serotina* (= *F. confusa* Jord.).

Sect. 2. Agrariæ.

(4.) *F. Gussonii* Bois. *γ Boræi* (= *F. Boræi* Jord.).

In Rouy & Foucaud's *Flore de France*, vol. i. 1893, the names stand thus:—

(1.) *F. capreolata* L.
α albiflora Hamm. Mon. (= *F. pallidiflora* Jord.).
(2.) *F. muralis* Sond. (sensu lato).
(1.) *F. muralis* Sond. (vera).
(2.) *F. Boræi* Jord.
. . . . .
(6.) *F. confusa* Jord.
(3.) *F. agraria* Lagasca.

In Haussknecht's excellent monograph of the genus in *Flora*, 1873, the forms occurring in Britain are arranged as follows, *viz.*:—

Subsection MURALIS.

a. Fruits rugose.

F. Gussonii Boiss. var. *diffusa* (= *F. confusa* Jord.).

b. Fruits smooth or nearly so.

F. Boræi Jord.

F. muralis Sond.

Subsection CAPREOLATA.

F. capreolata L.

b. *parviflora* (= *F. pallidiflora* Jord.).

In these three works the treatment of the forms differs considerably, but they agree in retaining the name of *F. capreolata* L. for the species which is designated by British authors, except Hooker, as *F. pallidiflora* Jord.; and they all consider *F. muralis* Sond. the form most nearly allied to *F. pallidiflora*, placing *F. Boræi* and *F. confusa* at the other end of the series.

The first name in the *London Catalogue*, F. PALLIDIFLORA Jord., which was introduced by Babington in 1859 in place of the Linnean name of *F. capreolata*, is associated with a well-marked and beautiful plant that has seldom been mistaken in this country. In France, however, another closely allied form is also widely distributed, *F. speciosa* Jordan, which recent continental authors have united with *F. pallidiflora* Jord. as varieties of one species, *F. capreolata* L. So far as I have been able to ascertain, there has hitherto been no authentic record of *F. speciosa* occurring in Britain, but a careful examination of the specimens collected by Mr. Andrews in Guernsey as *F. pallidiflora* has convinced me that they must be referred to that name. These plants strongly resemble *F. pallidiflora*, but are characterized by the smallness and comparative rotundity of their fruits, even in luxuriant specimens; by the sepals being shorter and more entire than in the British examples of *F. pallidiflora*; and by the back of the corolla being in some cases brightly tinted with pink even before fertilization. That these are the features whereby *F. speciosa* was distinguished from *F. pallidiflora* will be seen from the following extract from M. Jordan's original diagnosis of the former plant:—". . . Fructibus parvis lævibus rotundatis obtusis . . . . corolla . . . . dorso præsertim purpurascens. A *F. capreolata* L. differt præsertim floribus majoribus speciosiùsque coloratis, sepalis magis integris dimidium corollæ tubum haud superantibus, fructu obtusiore . . . ." (Cat. Grenoble, 1849). Respecting the fruits, Babington (who received specimens from Montpellier) also mentions that they are only half as large as in *F. pallidiflora*, and without the peculiar rectangular outline (Trans. Linn. Soc. 1859). A further difference that Jordan points out (Schultz, *Archives*, p. 305), and which seems to hold good in the Guernsey plants, is that the corolla lacks the persistency which is so marked a feature in *F. pallidiflora*.

With regard to the adoption of the name of *F. pallidiflora* Jord. in place of *F. capreolata* L., it may be remarked that Babington, in

making the change, supposed *F. speciosa* Jord. to have been satisfactorily identified with the Linnean plant, and proved specifically distinct from *F. pallidiflora*. There is, unfortunately, no specimen of the plant intended in the Linnean herbarium, and it can hardly be doubted but that Linnæus, by quoting Bauhin and Ray for the species, and simply giving the recurved pedicels as the essential character (Spec. 985), would have included under his name such plants as *F. speciosa* and also *F. pallidiflora*. And, so far as I am aware, both forms were included under it until 1849, when Jordan segregated his *F. speciosa*, retaining the Linnean name for the other form till 1854, when, considering it a source of confusion, he proposed to drop it in favour of *F. pallidiflora* (F. Schultz, *Archives*, p. 305). It would thus appear that, under our present rules of nomenclature, the Linnean name would still be properly applicable to *F. pallidiflora*, if that plant is regarded as distinct from *F. speciosa*; and as recent authors have united them as varieties of one species, and Jordan himself admits that they are very closely allied, there would seem to be every reason for abandoning *F. pallidiflora* as a separate specific name, and reverting to the Linnean *F. capreolata*.

In Haussknecht's monograph, two varieties of *F. capreolata* are shown—a. *grandiflora* and b. *parviflora*—which the author identifies with *F. speciosa* and *F. pallidiflora* respectively. In the case of the former of these, however, he seems to have overlooked Jordan's remarks as to the sepals and fruits, and I cannot think that his variety *grandiflora* is the same plant, or indeed anything more than a luxuriant form of the other. On the other hand, the differences indicated by Jordan appear to be of a more permanent nature, and not such as owe their origin to surrounding conditions; and, as they seem quite recognizable in the few authentic French specimens that I have examined, I regard *F. speciosa* and *F. pallidiflora* as worthy of more than merely varietal distinction, and therefore rank them as subspecies of the Linnean *F. capreolata*.

Coming to the second name in the *London Catalogue*, F. Boræi Jordan, I find that this species was originally described by the author in 1852, in his *Pugillus;* and as the determination of the British plants sent out under this name is one of the principal objects of the present paper, I trust I shall be pardoned for quoting *verbatim* a great part of the description, which is in considerable detail. He writes:—

"F. racemis . . . *brevibus* et sæpius paucifloris, bracteis . . . . pedicello subpatulo paulo brevioribus; sepalis *subrotundo-ovatis*, acutis, circumcircà inæqualiter, et crebrè inciso-dentatis, ... roseo-albidis, corollæ tubo roseo apice atro-purpureo *latioribus* eodemque *haud triplò* brevioribus; petalo superiore . . . . *imo apice angustato* . . . calcare sepala haud æquante vix longiore quam lato . . . fructu *subrotundo-obovato obtusissimo* apicè minutè foveolato, siccitate leviter ruguloso, stipite angusto brevissimo pedicelli crassitiem *haud superante* (in vivo) prædito.

"Species diù vexata et a multis pro *F. murali* Sond. habita, ab hac certissimè differt floribus sepalis fructibusque subduplò majoribus, petalis præsertim exterioribus sensim apicè angustatis haud

abruptè apiculatis, fructu minimè ovoideo acuto sed potius obovato obtusissimo."

On referring to the general collection in the Herbarium of the British Museum, I find under the name of *F. Boræi* Jord. specimens sent out by Billot and authenticated by Jordan, which undoubtedly answer closely to the above description. In general appearance they resemble *F. capreolata* less than *F. muralis* Sonder, with which, it should be observed, Jordan says *F. Boræi* has been confounded. But it can readily be seen that they differ in several particulars. The habit of growth is much stronger, and the flowers decidedly larger. The fruits agree precisely with the author's description, being clearly "obovato-obtusissimo" in outline; and differ widely from those of *F. muralis*, which Jordan designates as "ovoid-acute," but which Koch, writing of that species (Syn. Fl. Germ. ed. 2), describes as "subrotundo-ovatis, obtusis." Furthermore, the obovate fruits in Billot's plants are narrowed below to what appears to be well called a "stipite angusto brevissimo." In this connection the use of the word "brevissimo" should be noticed, "the very short neck" being equivalent to very little neck at all—a feature which may easily be mistaken in the dried plants, but which I have been able to confirm without difficulty from fresh examples that in all other respects accord with Billot's specimens. Another point of importance is that in Billot's plants the fruiting pedicels are straight. Jordan speaks of them as "subpatulo," without clearly stating whether they are straight or not; but Boreau, who undoubtedly was familiar with the plant, in his *Flore du Centre de la France*, ed. 3, says, "pédicelles droits, les fructifères étalés ou un peu recourbés." In this respect *F. Boræi* scarcely differs from *F. muralis* Sond., of which Koch says, "pedicelli patentes, sed non reflexi." The bracts and sepals of the two plants, though in each somewhat variable, are on the whole very similar, the former being clearly shorter and the latter smaller than in the forms of *F. capreolata* L. ("Sepala evidenter minora"—*F. muralis* in Koch, Syn.).

I think it is evident that the plant described by Jordan (the typical *F. Boræi*) is an ally of *F. muralis* Sond., and characterized by straight fruiting pedicels, large flowers, and very obtuse fruits narrowed below to an inconspicuous neck. I will therefore turn to the description of *F. Boræi* by British authors, which I shall endeavour to show refers to a different plant, allied to *F. capreolata* L. (= *F. pallidiflora* Jord.), which, as well as the true *F. Boræi* Jord., is an inhabitant of the British Isles, and has been the source of much of the confusion that prevails in this country with regard to this section of the genus.

The first notice of *F. Boræi* Jord. in British botany occurs, I think, in Babington's paper of 1859, where the writer describes it at some length, and distinguishes it not so much from *F. muralis* Sond. as from *F. pallidiflora* Jord. The essential characters of the plant are summarized in this description as follows, *viz.*:—

"Sepalis late ovatis dentatis tubi corollæ latitudine latioribus eodemque ⅓ brevioribus, *fructibus* subgloboso-compressis *truncatis*

latioribus quam longis demum paulisper rugulosis, basi fructus angusta *pedicellique apicem haud superante*, bracteis sæpe pedicellos floriferos paulo excedentibus *fructiferis patentibus* brevioribus."

Babington further mentions as one of its most conspicuous characters "the base or 'neck' of the fruit," which is "very narrow and nearly as long as broad, forming a kind of stalk to the fruit," and is "more conspicuous in *F. Boræi* than in *F. pallidiflora*." In continuation, he observes: "The fruit of my plant (without its base) seems to be always broader than long, and is remarkable for the squareness of its vertical outline and the stalk-like appearance of its base, approaching in form to that of *F. officinalis* L., but less broad and retuse. *F. Boræi* is perhaps too nearly allied to *F. pallidiflora*. Its corolla is always tinged with pink; its sepals are usually more toothed, and generally larger."

In this description, the fruit-stalks are stated to be "patent, straight, or rarely slightly deflexed"; but in Curtis's plate of *F. capreolata* in the *Flora Londinensis*, which Babington considered to certainly represent *F. Boræi*, they are shown as somewhat recurved. In this figure, also, the characteristic neck of the fruit is plainly indicated, but the sepals are much less than two-thirds as long as the corolla-tube.

Syme, in the third edition of *English Botany*, furnishes an account of *F. Boræi* which only differs from Babington's in one or two details. In distinguishing *F. Boræi* from *F. pallidiflora*, he notes a difference in the recurving of the pedicels (which he also calls "patent or divaricate"), the curve in *F. Boræi* not being at the base of the pedicel, as in its ally. By this author the neck of the fruit is considered to be, in both plants, very similar.

In recent editions of Babington's *Manual* and the *Student's Flora* *F. Boræi* is reduced to the rank of a variety of *F. capreolata* L., Babington adding that the corolla is purplish, and the fruit-stalks patent; and Hooker that the sepals are smaller and the petals redder than in *F. pallidiflora*, while the pedicels are not recurved.

Although there is a want of uniformity in the characters assigned to *F. Boræi* by Babington, Syme, and Hooker, yet a careful perusal of their works cannot, I think, but show that the species they have in view is quite different from that described in the *Pugillus*. They evidently refer to a plant having the facies of *F. capreolata* rather than of *F. muralis*, and, except Hooker, to one in which the fruiting pedicels are not clearly straight. It is surely impossible to reconcile the stalk-like neck of the fruit, which Babington thought so conspicuous, with Jordan's "stipite angusto brevissimo." And the square vertical outline of the fruit, broader than long, seems hardly compatible with the French author's "fructu subrotundo-obovato obtusissimo." There is also a remarkable discrepancy in the size of the sepals, which are certainly variable in these plants, but hardly differ so much that Babington and Syme should consider them nearly twice as long as they appeared to Jordan.

The explanation of these inconsistencies became apparent to me upon re-examining the Fumitories labelled *F. Boræi* in the British

collection at the Museum. Incorporated under that name were some plants which agreed more or less closely with the continental specimens and Jordan's description, and a certain number of others that were evidently different and in accord with the description given in *English Botany*. Among the latter is a well-preserved specimen labelled as collected in Fifeshire in 1871 by J. Boswell-Syme.

The plants of this latter class can be distinguished without much difficulty not only from *F. Boræi* Jord., but from *F. capreolata* L. They may be regarded as intermediate between these two plants, but undoubtedly are more nearly related to the latter, which they resemble in their "necked" fruits, and recurved fruit-stalks, as well as in their large sepals and long bracts. But their fruits are not only broader, but also less smooth when dry; and the curving of the pedicels is sufficiently distinct, as pointed out in *English Botany*. The corolla, under similar conditions, is a little smaller than in *F. capreolata*, with the upper petal rather more broadly winged, though less so than in good flowers of *F. Boræi*. Its corolla is always purplish, sometimes of a very deep tint, but more often pale, when it may be best distinguished from *F. capreolata* by its purplish hue extending completely over the spur, which it very rarely, if ever, does, I think, in the coloured flowers of the other. The sepals, which usually are even larger than in *F. capreolata*, are obtuse in many of the specimens that I have seen, with the apex distinctly rounded. They are generally suffused with the purple colour of the corolla, and frequently are marked with a broad longitudinal band of green.

At the time when I first distinguished this plant I was disposed to refer it to *F. speciosa* Jord., a form with which I was then very imperfectly acquainted. A comparison of its characters, however, with those assigned to *F. speciosa* in Jordan's original description assured me that it was more widely separated from that plant than from *F. pallidiflora*. In Rouy & Foucaud's *Flore de France* other varieties of *F. capreolata* and of the aggregate species *F. muralis* are enumerated, but none of them appear to be identical with Babington's plant, nor can I find that any of the forms described by Hammar and other authors entirely accords with it. It would thus seem to be a plant restricted to Britain, and as it is clearly separable from *F. capreolata*—no intermediates occurring in my experience—and lacks the strongly arched-recurved fruit-stalks which form the principal characteristic of that plant, I think it may be reasonably regarded as specifically distinct. As it has hitherto been known only as *F. Boræi*, a name which has now been shown to belong to a different species, I propose to re-name it **F. purpurea.**

The range of this plant in these islands seems to resemble that of *F. capreolata*, extending as far northwards as Orkney, and also to Ireland, while in the Channel Islands it is absent. I have seen specimens from Ilfracombe; Wroxeter; Malvern; Walton-on-Naze; Skipwith, Yorks; Bardsea, Lancs.; Westmoreland; Windermere; Galashiels, Selkirk; Haddington; Edinburgh; Dunearn Hill, Fife; Forfarshire; Orkney; and Wexford.

In many, possibly all, of these localities, not only *F. capreolata*, but also *F. Boræi* are likewise to be found, and in view of this it may be suggested that *F. purpurea* is a hybrid between them. If so, the uniformity of its characters in its various habitats and the freedom with which the seed is produced are a little remarkable; and under cultivation in my town garden its distinctive features have been maintained through at least two generations. Among the many wild Fumitories that I have examined one specimen only appears to me to be clearly a hybrid—a plant sent from Guernsey which I should label *F. Boræi* × *officinalis*. In this instance, the flowers were intermediate between those of the supposed parent forms, while all of the fruits remained quite undeveloped.

(To be continued.)

NOTES ON INDIGOFERA.

By David Prain, F.L.S., and Edmund Baker, F.L.S.

(Concluded from p. 67.)

I. hirsuta L. Sp. Pl. p. 751 (1753).

The original description runs :—

"Indigofera leguminibus pendulis lanatis tetragonis. Fl. Zeyl. 272. Amoen. Acad. i. p. 408.

Astragalus spicatus siliquis pendulis hirsutis, foliis sericeis. Burm. Zeyl. 37, t. 14.

Kattu-tagera. Rheed. Mal. i. p. 55, t. 30.

Habitat in India."

There is a specimen of this in Herb. Hermann, no. 272, which is this plant as we now understand it.

Plukenet's synonym for this plant, *Colutea orientalis plerumque heptaphyllis*, &c. (confer Alm. p. 113), quoted by Linnæus in the Fl. Zeylanica, as will be seen, is omitted from the description in Sp. Pl.

There is a specimen among the Petiverian plants in Herb. Sloane, vol. 161, p. 83, which bears the name "Colutea lanuginosa floribus parvis siliquis pilosis deorsum tendentibus," which, as will be seen, is also quoted by Linnæus in Fl. Zeylanica, but omitted in Sp. Pl. ed. 1.

This is the *I. indica* of Miller (Dict. ed. viii. 1768, no. 4).

I. glabra L. Sp. Pl. p. 751 (1753).

"Indigofera leguminibus horizontalibus teretibus, foliis pinnatis ternatisque. Fl. Zeyl. 274. Amoen. Acad. i. p. 408.

Colutea siliquosa glabra, ternis quinisve foliis, maderaspatana, semine rubello. Pluk. Alm. 113, t. 166, f. 1.

Nir-pulli. Rheed. Mal. 9, t. 67. Ray Suppl. 470.

Hab. in India. ⊙."

This plant is in Herb. Hermann, no. 274, and also in Herb. Sloane, vol. 96, f. 186. The name *I. glabra* takes precedence of

I. pentaphylla Murray, Syst. Veg. ed. xiii. p. 564 (1774). This is also *I. fragrans* Retz, Obs. p. 29 (1786), which was collected by Koenig.

I. DISPERMA L. Syst. Nat. iii. Appendix, p. 232 (1768); Berg in Berg & Schmidt, Darstell. u. Beschr. Officin. Gew. iv. 30 (1863).

I. caroliniana Miller, Gard. Dict. ed. viii. no. 3, probably (1768).

I. caroliniana Walter, Fl. Carolin. p. 187 (1788).

I. disperma is taken up by Linnæus from Trew Ehret. 24, t. 55; he had no specimen of it.

I. ANIL L. Mant. ii. p. 272 (1771).

Linnæus diagnoses and describes this plant, but no synonyms are quoted; the plant itself is exactly the same as *I. suffruticosa* Miller, Gard. Dict. ed. viii. no. 2 (1768).

Before discussing the propriety of recognizing the older name, it will be more convenient to deal with the treatment accorded to *I. Anil* by De Candolle. He recognizes three varieties:—

α OLIGOPHYLLA DC. Prod. ii. p. 225. Foliis 3–4 jugis leguminibus arcuatis. Sloane, Jam. t. 176, f. 3. Lam. Ill. t. 626, f. 2 (v. s. specimen e Sancto-Domingo et ins. Maurit.).

In so far as this variety is based on Sloane's figure and description, there is no room for doubt, for the type from which the drawing is made is present in the Sloane Herbarium. The plant there is what we now know as *I. truxillensis* H. B. K., and, though nearly allied to *I. Anil*, it is perhaps better treated as distinct. But, while this is the case, it has to be remembered that on the same sheet with two specimens of this variety *α oligophylla* there is glued down a specimen of the cultivated form of *I. Anil β polyphylla* DC. (which is *I. tinctoria* Miller, not of Linn. nor of Forsk.), and on the next sheet is an example of the wild form of *I. Anil β polyphylla* DC. (which is *I. suffruticosa* Miller, *I. Anil* L., and *I. Guatimala* Lunan). This Sloane has marked "præcedentis varietas."

When now we turn to the Prodromus Herbarium, we find that the material which has been placed in the cover of *I. Anil* consists of two specimens—(1) a specimen collected by Bory St. Vincent, locality not noted, which is actually = *α oligophylla*, i. e. is *I. truxillensis* H. B. K.; and (2) a specimen from San Domingo, collected by Poiteau. This, however, instead of being *I. truxillensis*, is the Indian *I. tinctoria*, and is not distinguishable from the form of *I. tinctoria* figured by Sloane, t. 179, f. 2.

I. truxiliensis H. B. K. (*I. tinctoria α oligophylla* DC.) is very far from being a common plant. Besides the specimens from the Orotava Garden and from Trianon, and that from Bory St. Vincent in Herb. De Candolle, the only specimens we have seen, beyond the specimens that form Sloane's types, are as follows:—Prov. de Bogota, Quetame, *Triana*! Guayamas, Mexico, *Palmer*, 102! Porto Rico, *Sintenis*, 146! 3682! Bolivia, at Larecaja, *Mandon*, 791! Columbia, near Bogota, *Hartweg*, 953!

It would almost appear, then, as if this species had been the species principally cultivated in the West Indies in Sloane's time, but that the cultivation of a form of the next species was already becoming the practice, and that soon the use of *I. truxillensis* was

to give place to that of *I. Anil* L. (i. e. *I. suffruticosa* Miller). It will be seen, however, from the following reference in Sloane (Cat. Plant. p. 142 (1696)), to the plant subsequently figured in Nat. Hist. Jam. t. 176, fig. 3 (which we consider to be *I. truxillensis* H. B. K.), that even in Sloane's time a good deal of obscurity existed as to the original source of American indigo:—

"Coluteæ affinis fruticosa argentea, floribus spicatis e viridi purpureis, siliquis falcatis. An herba e qua glastum vulgo anil exprimitur, in regno novo Granatensi sponte crescens. Laet. p. 380? An Colinil Hort. Mal. part 1, p. 103? seu polygala indica minor siliquis recurvis Syen. ib. p. 104? An Colutea Currassavica argentea angustifolia Par. Bat. pr. p. 325? *Wild Indigo*. In locis apertioribus & sterilioribus Jamaicæ & Caribearum Insularum ubique sponte nata reperitur."

It will be noticed that, while this is termed "Wild Indigo," it is not the "Wild Indigo called Guatimala" of Petiver.

β POLYPHYLLA. Foliis 5–7-jugis leguminibus arcuatis. I. Cornezuelo, Fl. Mex. ic. ined. (v. s. specimen ex Cayenna, Martinica, Sancto-Domingo). An species propria?

I. Anil of Linnæus and *I. suffruticosa* of Miller, which are the same thing, are *β polyphylla* DC.; but De Candolle's variety includes besides these the *I. tinctoria* of Miller, not of Linnæus, which is the cultivated form of the same species. It is, as a rule, inadvisable to supplant a name that has become so familiar in usage as the name *I. Anil* by one that happens to be a little older, but that has been practically lost sight of. In this case, however, it seems better to let the Linnean name fall out of use and to replace it by the older name *I. suffruticosa*, because the name used by Miller gives rise to no misconception, while the Linnean name may do so. The name *Anil*, though not inappropriate as a generic term, is not good as a specific one, because it is merely an elaboration of the vernacular word Nil, which alike in Egypt and in India indicates a species that supplies the Indigo-dye. The name, however, in Egypt connotes *I. articulata*, in India *I. tinctoria*, and, though doubtless the peoples of both countries might apply the same name to *I. Anil*, they do not do so in either, because *I. Anil* will not grow in Egypt and is not in favour in India. Had Linnæus applied the word *Anil* as a specific epithet to either *I. tinctoria* or *I. articulata*, the term, though not distinctive, would have been sufficiently apposite. But, as matters stand, he has applied the name to the species to which it is never applied in those countries where the term "Nil" originated. Doubtless he used the word because the name *Anil* is given in the Spanish-speaking parts of America to this species, but this application of the name by the common people of the New World is only a reflection of the erroneous notion which they seem to share with the learned (cfr. Morong, Plant. Paraguay), that *I. Anil* is an East Indian plant. The plant exists in two fairly easily distinguishable forms—(1) the cultivated, usually less, and (2) the wild, usually rather more pubescent. These forms cannot, however, be separated as distinguishable varieties.

The oldest reference that we can find to the cultivated form is

that by Hernandez in his *Nova Plant. Hist.* p. 108 (1651), where he figures and describes *xivhqvilitl pitzahac* seu *Anir tenuifolia*, which by exclusion can only be *I. Anil* β *polyphylla* DC. The number of seeds exclude *I. densiflora* Mart. & Gal.; and *I. Thibaudiana* DC. is equally excluded by the shape of the leaflets. The same character excludes *I. tinctoria* L., which, moreover, had probably not reached America from the East Indies in Hernandez's time.

The wild form of this species is the plant known as

I. Guatimala Lunan, Hort. Jamaicensis, p. 420 (1814).

Lunan, *l. c.* quotes for this "Indigofera 2. Assurgens minusque divisa, ramulis crassioribus striatis, spicis axillaribus." P. Browne, Nat. Hist. Jam. p. 302 (1789), where it is called "The Guatemala Indigo Plant."

De Candolle (Prodr. ii. p. 225) considers it synonymous with *I. tinctoria* L. β *brachycarpa* DC., but (see note on this variety) De Candolle's plant is not Linnæus's *I. Guatimala*, but is the *I. guatimalensis* of Moçino & Sessé, and of Poeppig. In Herb. Sloane, vol. 184, f. 8, amongst Dr. Petiver's plants is a specimen with the label "Wild Indigo cald Guatimala. Jam. HB.," which is the wild form of *I. Anil* L. (= var. β *polyphylla* and = *I. suffruticosa* Mill.). There is in the library attached to the National Herbarium a manuscript of Patrick Browne entitled: "A Catalogue of the Plants of the English Sugar Colonies"; on p. 52, he has under the head *Indigofera* three plants:

"1. Caule lævi, spicis ad imum usque floriferis. Slo. t. 179, 2.
2. Caule stricti, spicis imo nudis. Guatimala or Wild Indigo.
3. Subvillosa Colutea, &c. Slo. 176, 3."

No. 1 is *I. tinctoria* L.—the form *I. indica* Lam. No. 2 is the same as the afore-mentioned Petiverian specimen—the true *I. Anil*. No. 3 is *I. Anil* L. α *oligophylla* DC.—that is, *I. truxillensis* H.B.K.

Patrick Browne's specimens went to Linnæus's Herbarium (purchased for Linnæus by Solander); the probability therefore is that the solitary specimen of *I. Anil* in that herbarium, which is of the wild form of the plant, is from Browne. Browne (Nat. Hist. Jamaica) deviates a little from this treatment; there his *Indigofera* 1 is the same as No. 1 of the MS. List; but he refrains under either Nos. 2 or 3 from quoting a Sloane figure, and he there further separates Guatemala Indigo and Wild Indigo; thus practically transferring the term "wild Indigo" to *I. truxillensis*, as had been done in 1696 by Sloane. The explanation of the apparent discrepancy may be that both Sloane and Browne use the term "wild" as equivalent to native American, as opposed to *I. tinctoria* or introduced East Indian Indigo. If this supposition be correct, the term wild was equally applicable both to *I. truxillensis* and to *I. suffruticosa* = *I. Anil*.

It may be noted here that *I. divaricata* Jacq. Hort. Schoenbr. t. 365 (1798), is simply *I. suffruticosa* Mill. (*I. Anil* L.). It is, however, only right to state that, so far from agreeing that *I. truxillensis* H.B.K. (*I. Anil* α *oligophylla* DC.) and *I. suffruticosa* Mill. (*I. Anil* β *polyphylla* DC.) are different species, Berg, in Berg & Schmidt, Darstell. u. Beschreib. Offiz. Gewächs. iv. 30 d. (1863), does not

even agree with De Candolle in thinking them varietally distinct, and has renamed the two conjointly *I. Anil α drepanocarpa*. The explanation of this treatment is not obvious, but the probable explanation is that some confusion had taken place among Berg's specimens because, as it happens, the plant which he has figured as *I. tinctoria*, loc. cit., is not that species at all, but is *I. suffruticosa* Mill. (*I. Anil* L.), the very plant that in the text he has united with *I. truxillensis* (*I. Anil α oligophylla*) to form his *I. Anil α drepanocarpa*. Berg's *I. Anil* var. *β brachycarpa* is De Candolle's *I. tinctoria β brachycarpa*, which, in so far as it is different from *I. Anil* or *I. truxillensis*, is *I. guatimalensis* Moçino & Sessé, the plant that not only Moçino & Sessé, but Ramon de la Sagra and Poeppig assert to be Guatimala Indigo. Here again, therefore, a change of opinion or belief has taken place. The plant that in the time of Sloane and Petiver and P. Browne was known as Guatimala Indigo was the *I. suffruticosa* of Miller, the *I. Anil* of Linnæus, the *I. Guatimala* of Lunan; by the time of Moçino & Sessé and of La Sagra this name was used for *I. guatimalensis* of Moçino and of Poeppig (*I. tinctoria β brachycarpa* DC.).

I. Anil γ orthocarpa DC. *l. c.* Leguminibus deflexis rectis. Rump. Amb. v. tab. 80 ? (v. s. ex Madagascar et India Orient.).

The figure from Rumphius is that of a form of *I. Anil* (*I. suffruticosa*); the specimens in the Prodromus Herbarium are three in number—(1) a specimen with no note of collector or locality which is not a form of either *I. tinctoria* or *I. Anil*; (2) a specimen marked "Indes, Labillardière," which is the Northern Indian form of *Indigofera tinctoria*; (3) a specimen from Madagascar with no note as to the collector, which is the southern or Madras form of *I. tinctoria*.

It will be recollected that the plant taken for *I. Anil γ orthocarpa* by Schimper, Berg, and Baker, and treated by the two latter and by Vatke as a distinct species, is also a form of *I. tinctoria*, but is somewhat different from either of the forms of the species included by De Candolle under *I. Anil γ orthocarpa*.

I. argentea Burm. Fl. Ind. p. 171 (1768), non L.
I. semitrijuga Forsk. var. *β tetrasperma* DC. Prod. ii. p. 230.
I. Burmanni Boiss. Fl. Or. ii. p. 189 (1872).

We are inclined to agree with Boissier that *I. semitrijuga* Forsk. is conspecific with *I. enneaphylla* L. When describing his *I. Burmanni*, he stated that it differed from *I. semitrijuga* in having "racemis laxis et leguminibus elongatis (5–7 lin. longis) 4-6 nec 2 spermis." We are also inclined to agree with Vatke (in Oest. Bot. Zeit. xxvii. p. 202) that *I. Burmanni* and *I. tetrasperma* are hardly to be retained as distinct species.

Dr. T. Cooke, however, is inclined to think that, while the *I. semitrijuga* of the *Flora of British India* is certainly De Candolle's variety *β tetrasperma*, and is therefore *I. argentea* Burm., the original *I. semitrijuga* Forsk. is specifically distinct.

I. enneaphylla L. Mant. ii. p. 272 (1771).

Some confusion occurs in the synonymy in the original description of this plant, and Linnæus entirely revises it in the

Appendix to the *Mantissa*, p. 571. The first synonym, *Psoralea pinnata*, is in Harvey's *Flora Capensis*, and by other botanists considered now as a true *Psoralea*. The synonym "Colutea enneaphyllos, &c. Pluk. 113, t. 166, fig. 2" is the plant as we now understand it; but the next, "Colutea enneaphyllos siliquosa, &c. Pluk. Alm. 112, t. 166, fig. 3," is *I. viscosa* Lam.

**Hedysarum prostratum* Burm. Fl. Ind. t. 54, fig. 2 (*sic*); L. Mant. p. 102 (1767), for which "Colutea minima dispermos. Pluk. Phyt. t. 165, fig. 4" is quoted, is *I. enneaphylla* L.; and Burmann's name and plate are quoted by Linnæus in his revised diagnosis on p. 571.

I. ARTICULATA Gouan, Illustr. p. 49 (1773).
I. argentea L. Mant. ii. p. 273 (1771), excl. syn., non Burm.; L'Héritier, Stirp. t. 79 (1784).
I. spicata Forsk. Fl. Æg. Arab. p. 138 (1775).
I. houer Forsk. Fl. Æg. Arab. p. 137 (1775).
I. glauca Lam. Dict. ii. p. 246 (1789).
I. cærulea Roxb. Hort. Beng. p. 57 (1814).
I. brachycarpa Graham in Wall. Cat.
I. retusa Graham in Wall. Cat.

This has generally been called *I. argentea*, but the species bearing this name, described by Burmann in his *Flora Indica*, is earlier in date of publication (1768), and is altogether different. Linnæus, when describing his *I. argentea*, quotes two synonyms:—

1. "Anil leguminibus arcuatis incanis, &c. Miller, Dict. 1." This is *I. Anil* L., but is Miller's *I. tinctoria*, as his specimen so named in the National Collection shows.

2. "Colutea fruticosa argentea, &c. Sloane, Jam. p. 142; Hist. 2, p. 37, t. 176, fig. 3." There are two sheets of this in the Sloanean Herbarium. The first has three specimens—two are the plant figured by Sloane which is *I. Anil* L. var. *oligophylla* DC., the third being the plant which is var. *polyphylla* DC. Sheet 2, marked by Sloane "præcedentis varietas," is wholly occupied by *I. Anil* L. var. *polyphylla* DC. The Linnean description refers to the plant we now call *I. articulata* Gouan.

Chabræus (*Stirpium*, p. 82 (1666)) figures and describes a species which he names "Coluteæ foliis anil." As will be seen from the following description, this can only apply to *I. articulata* Gouan (= *I. argentea* L., excl. syn.), the Nil of Egypt, but not of India:—"Sunt nobis *Anil* nomine rami duo missi, pedales, similes fere ramis Cytisi lata siliqua, rigiduli, incani, & fere argentei: in folia divisi Coluteæ vulgaris, ovata glauca quinquefolia communiter, rarius trifolia, ex communi costa incana. De flore & semine nihil certi nobis constat. Facies tamen plantæ satis insinuat ad Coluteas referri posse." This figure has frequently been quoted incorrectly; thus, for instance, Dr. Petiver (Phil. Trans. 1700, p. 703) quotes it under his No. 57, "The true Indigo"—his specimen being *I. tinctoria* L.

Gouan, when describing his species, quotes a synonym and figure

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* Burmann's plate of *H. prostratum* is tab. 55, fig. 1, correctly quoted by Linnæus on p. 571.

from Zanoni (Hist. p. 18, tab. 12): "Anil africanum siliquis brevibus articulatis." Gouan's synonymy and description leave no doubt as to the species intended, and there are specimens from him in Herb. Kew.

There is a specimen of Forskahl's *I. spicata* in the British Museum Herbarium which is certainly referable here. *I. glauca* Lam. is quoted by De Candolle as a synonym of *I. argentea* L., non Burm. Lamarck quotes the afore-mentioned figure from Zanoni, and this is also *I. articulata*. *I. brachycarpa* Graham in Wall. Cat. 5470 (= *I. tinctoria* L. var. *brachycarpa* Baker, non DC. Prod. ii. p. 224) is correctly placed in the *Flora of British India* as a synonym of the var. *cærulea* of *I. argentea* L., non Burm.

I. brachycarpa Graham and *I. retusa* Graham are quoted by Miquel as synonyms of *I. Anil* L. *β polyphylla*, which they are not; both of them are the *I. cærulea* Roxb.

Linnæus in his herbarium never used the name *I. argentea*, the solitary specimen of *I. articulata* Gouan in that collection having been named by Linnæus himself *I. tomentosa*. This name has been corrected to *I. argentea* by Smith. *I. tomentosa* Herb. Jacquin is *I. Anil* L.

In *Species Plantarum*, ed. iv., *I. houer* is quoted as a synonym of *I. tinctoria*; it is, however, of *I. tinctoria* Forsk., the "Nil" of Egypt and Nubia; not the earlier *I. tinctoria* L., the "Nil" of India, whereof *I. houer* is a synonym. *I. houer* is the form of *I. articulata* which extends to Scinde and Rajputana from Arabia, and stands intermediate in characters as it does in locality between the Egyptian or original form of *I. articulata* and the eastern state of the same species named *I. cærulea* by Roxburgh.

The *Index Kewensis* cites *I. houer* by mistake as = *I. lateritia*.

I. OBLONGIFOLIA Forsk. Fl. Æg. p. 137 (1775).
I. paucifolia Delile, Fl. Ægypt. p. 251 (1812).
I. desmodioides Baker in Kew Bulletin, non Baker in Journ. Linn. Soc., is identical with the above. See Vatke in Oest. Bot. Zeit. xxvii. p. 201 (1877).

I. LINIFOLIA Retz, Obs. iv. p. 29 (1786); vi. p. 33, tab. 2 (1791).
Hedysarum linifolium L. fil. Suppl. p. 331 (1781).

Linnæus quotes this from "India orientali. König." Koenig's specimens are in the National Herbarium—his MS. diagnosis for this species was:—

"Herbacea. Foliis simplicibus lineari-angustis canescentibus. Leguminibus globosis niveis, monospermis: habitat in ruderatis ad pedes montium minus frequens."

I. ATROPURPUREA Buch.-Ham. ex Roxb. Hort. Bengal. p. 57 (1814).

In the British Museum Collection there is a sheet named by Roxburgh *I. atropurpurea* Buch.-Ham. This is the plant usually accepted under this name, and it shows what Roxburgh meant in the *Hortus Benghalensis* (1814). The same plant was issued as *I. atropurpurea* Hb. Roxb. in Wall. Cat. 5463 (date 1814). The sheet which Buchanan-Hamilton in his own hand named *I. atropurpurea*, the type of the plant described in Don's Prod. p. 244 (1825), collected at Narainhetty, 7 Feb. 1803, is *I. pulchella* Roxb.

I. TRUXILLENSIS H. B. K. Nov. Gen. et Sp. vi. p. 456 (1823).

See note on *I. Anil* L. var. *α oligophylla* DC.

The *I. Anil* of Lunan, in so far as it is based on Sloane (Nat. Hist. Jam. tab. 176, fig. 3), is this species.

I. THIBAUDIANA DC. Prod. ii. p. 225 (1825).

Bentham, in a note at the end of *Indigofera* in Martius' *Flora of Brazil*, correctly refers to this species *I. excelsa* Mart. & Gal. in Bull. Acad. Brux. x. 1843, p. 45, and *I. costaricensis* Benth. in Kjoeb. Vidensk. Middel. 1853, p. 5.

I. LEPTOSTACHYA DC. Prod. ii. 225 (1825) = *I. pulchella*.

I. MULTICAULIS DC. Prod. ii. p. 223 (1825).

I. trifoliata Don, Prod. Fl. Nepaul, p. 245 (1825).

I. canescens Spreng. Systema, iii. p. 274 (1826).

Buchanan-Hamilton's specimen from Suembu, upon which the above was founded, is in the National Herbarium. It is, as stated in Fl. Brit. India, synonymous to *I. trifoliata* L.; the var. *multicaulis* Miq. is hardly *I. multicaulis* DC.

I. DOSUA Buch.-Ham. in Don, Prod. Fl. Nepaul, p. 244 (1825); DC. Prodr. ii. 225 (1825). *I. polyphylla* DC. *l. c.* 227.

Buchanan-Hamilton's specimen from Suembu is in the National Herbarium; it is referred to in DC. Prodr., but is not at present in the Prodromus Herbarium. The same species is in the Prodromus Herbarium, however, where it forms the type of *I. polyphylla* DC. Prodr. ii. 227 (1825).

I. BUNGEANA Walp. in Linnæa, xiii. p. 525 (1839); Steudel, Nomenclator, part 1, p. 806 (1840).

I. micrantha Bunge, Enum. Pl. Chin. Bor. p. 16, nec alior.

I. tinctoria Forbes & Hemsley, Index Fl. Sinensis, p. 157 (1886–88) in part.

The last-named is in part (*e. g.* Amoy, Fortune, A. 56. Herb. Mus. Brit.) the above species; we have also seen plants referred to *I. tinctoria* from Japan by Maximowicz, which in our opinion also belong here.

I. TEYSMANNI Miq. Fl. Ind. Bat. i. 1083 (1855).

I. Zollingeriana Miq. *l. c.* p. 310 (1855).

Tephrosia? sp. Zoll. in Nat. en Genesk. Arch. iii. p. 54 (1846).

I. galegioides Vidal, Pl. Cuming. p. 107, non DC. (1885); Vidal, Pl. Vasc. Philip. p. 105, non DC. (1886).

I. Benthamiana Hance in Ann. Sc. Nat. ser. iv. xviii. (1862), p. 219.

We have seen specimens of this species from China, Formosa, Tonkin, Saigon, Philippines, Moluccas, Sumatra, Java, Borneo, Perak, Malacca, and New Caledonia.

I. ARRECTA Hochst. in Schimp. Hb. Alyss. No. 1923; Baker in Fl. Trop. Afr. ii. p. 97 (1871).

I. umbonata Welw. MSS.; Baker, *l. c.* 98.

I. Anil Guill. & Perr. & Rich. Tent. Fl. Seneg. p. 180 (1831–33).

This must not be confused with *I. arrecta* Bentham, from South Africa, as the above species also reaches the Cape. For the latter, which is later of publication, we propose the name I. CONFUSA.

This is the well-known Degendeg (Dek Indig) of Abyssinia, and is the chief Indigo-producing species in Africa outside the area occupied by *I. articulata*. It is now largely cultivated in Java as "Natal Indigo" under the erroneous name *I. leptostachya*. It is not the true *I. leptostachya* DC., which is a form of *I. pulchella*; nor is it Zollinger's *I. leptostachya*, which is a form of *I. tinctoria*.

I. LONGERACEMOSA Boivin ex Baillon in Bull. Soc. Linn. Par. i. (1883), p. 399.

I. tinctoria L. var. *brachycarpa* Vatke in Oest. Bot. Zeit. xxviii. p. 214, 1878, non DC.

The type was from Madagascar, *Boivin*, no. 2214 *bis*, Nossibé, in collibus herbosis inter Djabal et Hellville ad Amponbilavi. Other specimens are—Nossibé, *Pervillé*. Maroa, forêts à l'intérieur de la baie d'Antongil, *Mocquerys*, no. 45. Insel Sansibar, *Hildebrandt*, no. 941.

Col. Beddome has specimens from the Tinnevelly Hills and from S. Travancore that are not distinguishable from the above.

The following note occurs in Baillon's description:—"Sect. *I. tinctoriæ*, cui ad tingendum, ex incolis, planta anteponenda."

I. CUERNAVACANA Rose in Contrib. U. S. Herb. vol. v. No. 3, p. 140 (1897).

Hab. Cuernavaca, *C. G. Pringle*, 1896, no. 6323; *Bourgeau*, no. 1192.

Closely allied to *I. excelsa* Mart. & Gal. (*I. Thibaudiana* DC.), from which it mainly differs by its smaller flowers.

A NEW *MOUGEOTIA*.

By Wm. West, F.L.S.

EXAMPLES of this alga were forwarded to me from the Natural History Museum for examination; I find the plant is undescribed, and, as it is in interesting condition, I append the following description. The materials were collected by the Rev. A. Campbell, at Pokharia, Chota Nagpur, and sent by Dr. Prain.

Associated with it, though very sparingly, were *Cosmarium Logiense* Biss., *Tabellaria flocculosa* Kütz., and *Cymbella cymbiformis* (Ehrenb.) Van Heurck, var. *β parva* (= *Cocconema parvum* W. Sm.).

The material had been dried, and had to be soaked out.

Mougeotia immersa, sp. n.—Cæspites dense intricati, fili cellulis 1–3-plo longioribus quam latis; zygosporis subellipsoideis, subinde subglobosis, axe longiore transverse disposito, fere cum parte tertia diametri intra gametangium quamque, cum parte tertia reliqua inter gametangia, membrana glabra, crebro leviter et irregulariter subundulata. Conjugatio subinde sed rarissime lateralis est.

Lat. cell. 20–24 μ; zygosp. 30–40, sæpe 40–48 μ.

NOTES ON POTAMOGETON.

By Arthur Bennett, F.L.S.

(Continued from Journ. Bot. 1901, p. 201.)

Potamogeton Morongii, nov. sp. Section (*Natantes*) *Heterophyllii* Koch. Lower part of stem striated, and spotted (much as in *P. pulcher* Tuckerm.); with numerous partitions which show notably when dry (much as in *Juncus*), but cease where the first leaf is produced; simple (or nearly so), slender, with long internodes. Lower leaves consisting of very narrow phyllodia (varying from bright green to blackish green). Upper leaves lanceolate to elliptical, the uppermost reddish brown and coriaceous; stipules acute, strongly nerved, not winged; peduncles slightly thickened in the middle; spikes many-flowered; perianth segments reniform-orbicular, with hafts of equal length to the length of the segments, strongly 4-veined; fruit obliquely obovate, ventral face nearly straight (the style forming a continuation of the face, not recurved), dorsal rounded, bluntly tricostate, with a projection towards the base, almost forming a tooth. Stems 12–24 in., internodes long. Leaves 18 lines long × 6 lines broad to 12 lines × 8 lines, semi-coriaceous to coriaceous. Stipules 12 to 15 lines long. Peduncles 15 to 18 lines long. Spike 9 lines long.

Hab. Japan: Plaine de Numasaki, *Abbé Faure*, No. 32. Shonai, No. 34, 1897.

A species with the habit of *P. variifolius* Thore,* the stipules and leaves resembling those of *P. polygonifolius*, and the fruit allied to *P. americanus* Cham. It also resembles, in the submerged slender phyllodia and small floating leaves, the North American *P. Oakesianus* Robbins, but in that the structure of the leaves is similar to those of *P. natans* L., though much smaller; while in *Morongii* they have the structure of *polygonifolius* Pour.; the spikes also are longer, and the fruit different in the American species.

This species is a good instance of the variability in shape of the fruit in maturing; a series taken off one spike would almost certainly pass for different species, if considered by themselves. Ripe fruit and that alone should be considered in this genus; and while such species as *P. javanicus* Haskl., *P. Miduhikimo* Makino, and *P. cristatus* Regel & Maack are almost (quite ?) impossible to separate if only in foliage; with ripe fruit they can be separated by the touch alone, without using one's eyes.

I name this species after my late friend Dr. Thomas Morong, of Columbia College, New York, in whom we have lost one of the most devoted students of the genus, and whose kindly help I shall never forget.

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* Is this plant known to produce fruit?

P. similis, nov. sp. Section (*Natantes*) *Heterophyllii* Koch. Stem short, sparingly branched, rather slender. Lower leaves membranaceous, linear-lanceolate, attenuated into the petiole, and semi-acute; 3–5-nerved, the central one with a band of elongated caniculate areolation. Upper leaves coriaceous, rotund-elliptical, or oval, with five principal, and eight secondary nerves, and very numerous cross-veins. Stipules blunt, very thin and translucent, soon decaying. Peduncles thickened in the middle. Spikes with numerous flowers, the majority of which are fertile. Fruit compressed-suborbicular with a short style, tricarinate with the three margins sinuous-winged; two small teeth at the base of the ventral face. Stems 4–12 in. Leaves 10 lin. long × 5 lin. broad; submerged 24 lin. × 2–3 lin. broad. Stipules frayed into fibres by the time of flowering. Spikes 7 to 9 lines.

Hab. Swan River, W. Australia; *Drummond*, no. 117, 1847, and 1851; Tasmania: Swanport, *Dr. Story*, ex F. Mueller; Lagoon, York Plains, near Outlands, *Herb. Boissier*.

This species may be contrasted with *P. Drummondii* Bentham, and *P. tricarinatus* Muell. & Bennett. The first holds a middle place between these two species, though not really like either of them; approximating more towards *P. tricarinatus*. I have had this plant before me for some years, but I could not decide on its grade. In facies something like *P. Drummondii*, yet on comparison totally distinct. On the other side, doubts as to its distinctness from *P. Tepperi* Ar. Benn. were felt, from the fact of the great difference in the growth of the fruit in Australian species. Even with care it is not easy to decide on the distinctness of some forms. When the description of *P. sulcatus* mihi and *P. tricarinatus* Muell. & Benn. were made, the material was not so rich as, thanks to the kindness of Herr Baagöe, it now is. It seems to me that we have in these two Australian plants just the same analogy as between the two American species, *P. amplifolius* Tuckerm. and *P. pulcher* Tuckerm. This analogy or likeness is so great in some cases, that specimens are often cross-named by American botanists, as Dr. Morong admitted to me.

When the genus comes to be better understood and studied, these instances of likeness (yet dissimilarity) will be found to be very interesting, and may lead up to some peculiar questions of geographical distribution.

Of the above two American species I can extend the distribution slightly beyond that given by Dr. Morong. Of *P. pulcher* I have seen specimens from Florida, Rugel (as *natans*) in Herb. Mus. Brit., and Kentucky, C. W. Short, 1842, in Herb. Vindob., though occurring in Maine!, it is curious it has not yet been found in Canada. *P. amplifolius* occurs westward to Oregon, Hall, No. 488a (as "*P. rufescens* Schrad."), and southwards to Florida; Chapman, 1844, as "*P. natans* L." in Herb. Boissier.

The Rev. J. O. Hagström has described a new species of *Potamogeton*: *P. linguatus*, in Dusen's *Kent.* d. Gefässfp. des sudliches Patagonians (*Oversigt af Kongl. Vet. Akad. Forhand. No.* 4, p. 259–

62 (1901), with a plate (photo-process). The figure looks much like a *polygonifolius* form, but the enlarged leaf-structure quite denies this, and from this and the figure (outline) of the fruit I should think its place is near *P. alpinus* Balb. = *rufescens* Schrad.

P. rectifolius Ar. Benn., P. AMERICANUS Cham. × P. ALPINUS Balb. Apparently hybrid. It differs from *americanus* in the smaller floating leaves, usually of a reddish green colour, the shorter petioles, with the nervation intermediate between the two plants, and sparse-flowered longer spikes. From *alpinus* it differs in the thicker texture of all the leaves, only the upper ones inclining to reddish in drying, the longer petioles to the floating leaves; from both in the straighter, more upright growth, especially the leaves; less diffuse than in *alpinus*, more so than in *americanus*.

Gathered by the Rev. E. J. Hill in railway ditches, Stoney Island, Chicago, Ill., U.S.A., in Aug.–Sept., 1900, and Aug. 1901. This is not the same as *P. Faxoni* Morong, Mon. N. Am. Naiad., t. 32, p. 22, 1893, which, notwithstanding a good series from the author, I have some difficulty in separating from *P. americanus* Cham. (*P. Lonchites* Tuckerm.).

Mr. Hill observes, "In water 1–3 ft. deep; stems 4–6 dm. long, pale green or whitish, rooting in the mud, branching. Floating leaves coriaceous, oblong- to linear-lanceolate, 5–10 cm. long, obtuse or "obtusish," 12–14-nerved on petioles 2–4 cm. long; submersed leaves 5–15 cm. long, laxer, linear; thinner, pellucid, usually wavy, coarsely reticulate, acute or [sub-acute], 10–12-nerved, nearly sessile, or tapering to a petiole 0·5–1 cm. Stipules 2–2·5 cm. long, shining, acuminate. Peduncles 4–5 cm. long, slightly thickened upwards; spikes 2·5–3 cm. long; not in fruit."

I am unable to refer this to any described species, and the condition of the spikes is such as to suggest hybridity. Mr. Hill writes: "I followed up the peculiar form you deem a hybrid of *lonchites* and *alpinus*, but did not this year see any in flower even. It was abundant in the ditch where seen last year, and the ditch was very thoroughly looked over for its whole length on both sides. This Potamogeton was the prevailing form; *natans* next to it, in quantity, of kinds with floating leaves, and a little *lonchites* was found."

It is possible to object that no *alpinus* was seen, but some of the upper leaves have a structure that no other known species could produce. And exactly the same changes take place in drying that do in *alpinus;* I have soaked some of the specimens, and by this means thrown back the red colouring, and again produced it while drying.

P. PUSILLUS L. var. PSEUDO-RUTILUS Ar. Benn. in Journ. Bot. 1901, p. 201. On the receipt of further specimens of this plant from the Rev. E. J. Hill, gathered in 1901, and on examining the forms of *pusillus* from all parts of the world, I have come to the conclusion that this must be held a species. It is the most rigid-leaved of the genus known to me (*P. rigidus* Wolfg. R. et S. Mant.

iii. 359, 1827, is an uncertain plant, as yet not strictly known); this, and its numerous gemmæ (or winterbuds) are two of its most characteristic features.

The only others in the *pusillus* group that produce these in anything like such abundance are *P. gemmiparus* Morong (Bot. Gaz. v. 51, 1880) = *P. pusillus* L. var.? *gemmiparus* Robbins (in A. Gray, Man. ed. 5, 489, 1867); and a variety of *pusillus* (*P. Berchtoldi* Fieber almost certainly) from Rochfort-sur-mer, Char.-Inf., France, gathered and sent to me by M. Foucaud in August, 1889. This latter has them almost as large and abundant as the American plant I am now naming. I propose the name *P. strictifolius* for this species; last year I did not sufficiently recognize the marked features that make this stand apart from the numerous forms of the *pusillus* group. It has certainly a likeness to *rutilus* in habit and stipules, but it differs widely in that the lower stems are much elongated; usually the reverse is the case in *rutilus*. The U.S.A. plant is not in fruit, but the spikes and flowers are sufficiently advanced to see they correspond with the Canadian (Lake Scugog) plant, which is in good fruit.

P. strictifolius, sp. n.—Stems 12–20 in. high, simple for two-thirds of their length, then divaricately branched, often with short patent branches ending in gemmæ. Leaves 12–15 lin. long by 1 lin. broad, very rigid, linear, or slightly tapering at the end, with the edges mostly revolute, spreading in a fan-like manner, 3-nerved, the central one much thickened, and raised above the surface, the others faint.

Stipules linear-lanceolate acute, on the lower part of the stem soon decaying, on the upper and branches as long as the internodes, closely appressed to the stem, finely but strongly veined with numerous veins, strongly reticulate between.

Peduncles rigid, 12–18 lin. long, slightly tapering upwards, spikes slightly interrupted, 3 lin. long (with 3–8 fruits), sepals (perianth-segments), long-hafted, orbicular, truncate at the base.

Fruit 1 lin. long by $\frac{1}{2}$ lin. broad, obliquely elliptical (with the style nearly in a line with the ventral face), ventrally nearly straight, dorsally semicircular, with the face rounded, and very faintly 2-carinated.

The fruit seems to hold a middle place between that of *pusillus* and *lateralis* Morong (Bot. Gaz. v. 51, 1880); it is impressed on the sides, but this may be the result of shrinking in drying; though it is not always so, as fresh gathered fruits of some species have this impression and retain it. For a species of the *graminifolius* group this plant is remarkable in the habit, and disposition of the leaves, reminding one of the growth of the *scoparius* forms of *interruptus* Kit., but of course not with the numerous leaves of that section.

Mr. Hill remarks that this "showed flowers in a good many plants but no fruit. It breaks up into pieces with the bud-like ends of the branches attached, or these short branches break off late in the season with the greatest facility, and thus readily propagates itself. I do not despair of finding it in fruit yet, but realizing that

the conditions are unfavourable where there is the means of multiplying so fully supplied."

P. AMPLIFOLIUS Tuckerm. In some valuable notes on the variation of species of Potamogeton,* Mr. Hill remarks that in the Lake Superior region this often occurs with branched stems, and this distinction between it and *P. Illinoensis* Morong will not hold good; it also often has pointed bi-carinate stipules. But so far as one can judge from a very fine series of *amplifolius* (including specimens from Tuckerman) from over its whole area of distribution, the submerged leaves would seem to keep them sufficiently apart, exclusive of the other characters. These investigations *in situ* are very valuable, but difficult, unless one has unlimited time. If correct, the notes on "*P. lucens*" point to a condition of growth in that species that has never been observed before, and would need direct cultivation to confirm.

By the kindness of Professor Macoun and his son, I have a set of the Potamogetons gathered last year in the Canadian Dominion; among them is one gathered by Professor Macoun, at Little Eagle Harbour, Lake Huron, Ontario.

It consists of only young specimens, without flower or fruit; but so characteristic are these, that it seems possible to name them with a great deal of certainty as *P. Hillii* Morong in Bot. Gaz. vi. 290, 1881. Unless it is this, it is most probably a new species, as there is no other American species with the young growth as this. In *zosterifolius*, *acutifolius*, *obtusifolius*, &c., the young plants always have broader leaves than those produced afterwards, in the first often double the width and a sixth the length. On the contrary, these are narrower and acute (instead of being broad and obtuse). If correct (and I have little doubt of it), it extends its distribution far northwards. It occurs in the United States in New York!, Michigan!, and Ohio!. Herr Baagöe sent me specimens from Japan named interrogatively "*P. Hillii*," and I was much inclined to agree with him, the specimen seemingly corresponding with Chinese and Indian specimens I had doubtfully so named. But the somewhat careful examination I have made of these Canadian, and the U.S.A. specimens makes me doubt its correctness, and to consider that the Asiatic specimens may have to be referred to my *P. Preussii* (Fl. Trop. Afr. viii. p. 222, 1901), or be described as a new species; or that the Chinese specimens may be *Hillii*, but not the others. But more material is needed.

(To be continued.)

* Bot. Gazette, xv. pp. 147–149, 326–327 (1890).

ON THE DISTRIBUTION OF RUBI IN GREAT BRITAIN.

By the Rev. W. Moyle Rogers, F.L.S.

So much steady work has been done lately in tracing the distribution of Rubi in most parts of Great Britain, that the time seems come when we may profitably examine and to some extent tabulate the results achieved. For the present it seems best not to include Ireland and the Channel Islands in the review. *R. idæus* may also be left out of general consideration, as, though it has long been known to occur in all the British vice-counties except two (West Cornwall and Pembroke, from neither of which is it likely to be absent), it seems impossible to ascertain now how often its presence may be due either to the immediate neighbourhood of gardens or the intervention of birds.

Probably nearly three-quarters of the 112 Watsonian vice-counties have now been fairly well explored by batologists. In some of them the number of the forms recorded is not likely to be greatly increased by further research. But in a few only, and those all in the south and middle of England and Wales, can the bramble flora be said to have been at all exhaustively ascertained.

On the other hand, there are no less than 33 vice-counties which seem still virgin ground for the bramble student. In giving these I add in brackets the number of forms clearly known for each, omitting such additional records as seem to need confirmation :—

Edinburgh	0.	Cambridge	8 each.
Peebles	1 each.	N. Lincoln	
Haddington		Durham	
Orkney		Dumfries	
Shetland		Fife & Kinross	
Roxburgh	4 each.	S. Aberdeen	
W. Sutherland.....		Elgin.....	
Selkirk	3 each.	N. Ebudes	
S. Ebudes.....		Hebrides	
Caithness	5.	Kirkcudbright	9 each.
S. Lincoln	6 each.	Linlithgow	
Isle of Man		Kincardine	
Lanark		N. Aberdeen	
Forfar		Cantire	
Hunts	7 each.	W. Ross	
Berwick		E. Sutherland	
Mid Ebudes			

Of these 33 vice-counties in Great Britain with less than 10 distinct Rubi (other than *idæus*) known for each, 27, it will be seen, are Scottish; and, as the whole number of Scottish vice-counties is only 41, the number of those known to have more than 9 fruticose Rubi each is but 14. These 14 vice-counties average not quite 19 forms each, though 5 of them have 20 or more, and 2 as many as 30 each.

The present record for these 14 best-worked Scottish vice-counties is as follows :—

Banff	10.	W. Inverness	19.
Ayr, Dumbarton, E. Ross	14 each.	Wigton	21.
E. Inverness, Clyde Isles	15 each.	Argyle	22.
Renfrew, E. Perth	16 each.	Stirling	27.
		W. Perth & Clackmannan, Mid Perth	30 each.

For the whole 41 Scottish vice-counties the average number of forms at present known with certainty is only slightly in excess of 10. Further research will probably increase these numbers in every case, and ultimately perhaps bring up the average for the South and Mid Scotland counties to about 20, or possibly even 25 distinct forms. But the low record for all the northern isles, and (in a less degree) for the Highlands generally, will certainly be so far maintained as to keep the general comital average for Scotland immensely below that for England and Wales combined, which at present stands as high as 39. Indeed, out of our 167 fruticose Rubi in Great Britain, 63 only have yet been found north of the Tweed; the vast majority of these moreover belonging to eglandular groups. On the other hand, there are 5 out of the 63—*Rogersii*, *Scheutzii*, *villicaulis* (type), *danicus*, and *melanoxylon*—which seem considerably more abundant in Scotland than in either England or Wales.

In Wales generally the genus is well represented, yielding 119 forms, which are widely distributed through the Principality.

In South England (including Norfolk, Northants, and Warwick) no less than 162 forms occur; *i.e.* all the brambles known in Great Britain, except the 4 very rare fruticose forms, *durescens*, *chrysoxylon*, *Lejeunei*, and *rubrifolius*, with the montane subherbaceous *R. Chamæmorus*. Indeed, in the county of Hereford alone 119 are now known (the same number as for all Wales), 79 in Surrey, 76 in Berks, and 74 in West Kent. In North England, Staffs with 77, Derby 65, and Leicester 64, head the list at present, and the total number of forms known is 107; *i.e.* 12 less than occur in the one south-western county Hereford, or in the neighbouring Principality of Wales.

As regards the distribution of individual forms, the following particulars may be of interest. Leaving out of the account the generally-distributed *R. idæus* (known in 110 out of the 112 vice-counties of Great Britain) and the aggregate species *R. corylifolius* (known in 90), the most widely-distributed species and subspecies are the following 10:—

R. Lindleianus	in 77	R. *saxatilis*	in 69
pulcherrimus	,, 76	*plicatus*, *sublustris*	,, 62
cæsius	,, 74	*Selmeri*	,, 61
dasyphyllus	,, 72		
rusticanus, *leucostachys*	,, 71		

Of these the subherbaceous *R. saxatilis* seems to be too exclusively confined to hilly districts for occurrence in several of our southern

and eastern counties; but the other 9 may probably be correctly described as *generally distributed* throughout Great Britain, exclusive of the northern isles and other exceptionally bare parts of the Highlands of Scotland. It must be added, however, that by the expression "generally distributed" in this connection is meant—*found in all, or very nearly all, the v.-c.'s, though not in all parts of them;* 5 of the 9 (*Lindleianus*, *pulcherrimus*, *dasyphyllus*, *plicatus*, and *Selmeri*) apparently preferring sand and gravel to all other soils, while the remaining 4 (*cæsius*, *rusticanus*, *leucostachys*, and *sublustris*) distinctly desiderate some admixture of clay or lime. Probably, if we take Great Britain as a whole, the species which appears at the head of the list, *R. Lindleianus*, is really our most abundant bramble, as it is certainly one of the most constant and most easily recognized. Of the others, *R. dasyphyllus* becomes comparatively scarce in the extreme south of England, though usually most abundant and widespread elsewhere; while the remaining 7 species, though so very generally distributed throughout the country, and so conspicuously abundant in most parts, are occasionally sought for in vain through rather extensive districts.

Next in frequency to these are the 12 which are known to occur in more than 40 v.-c.'s, but not in more than 60, *viz.*:—

R. mucronatus	in 60	*R. macrophyllus*	in 45
echinatus	,, 57	*Sprengelii*	
diversifolius	,, 55	*hystrix*	,, 44
cyclophyllus	,, 53	*Schlechtendalii*	,, 43
fissus	,, 49	*pyramidalis*	,, 42
radula	,, 48	*suberectus*	,, 41

All these 12 certainly extend some way into Scotland, except *hystrix*, which has been reported from two divisions of Perth, but can hardly yet be assigned with certainty to any Scottish locality. Most of them are certainly distributed widely through Great Britain; and some may yet prove as common as a few in the first list.

After these are 30 forms known to occur in more than 20, but not in more than 40 v.-c.'s:—

R. Balfourianus	in 38	*R. villicaulis*	in 26
tuberculatus	,, 37	*argentatus*	
Chamæmorus		*Koehleri*	
carpinifolius	,, 35	*Rogersii*	,, 25
foliosus	,, 34	*anglicanus*	
infecundus		*pallidus*	
incurvatus	,, 33	*rosaceus*	
infestus		*micans*	,, 24
ferox		*Babingtonii*	
dumnoniensis	,, 31	*nitidus*	,, 23
hirtus	,, 30	*Lindebergii*	,, 22
echinatoides	,, 28	*anglosaxonicus*	
erythrinus	,, 27	*Bloxamii*	
gratus		*fuscus*	
		angustifolius	,, 21
		scaber	

Many of these are no doubt more or less local; but they are without a single exception quite frequent in several widely-separated counties, while most of them are probably rather more generally distributed than has yet been ascertained.

In addition to the 54 commoner British brambles treated of above, we have 113 others, none of which have as yet been certainly found in more than 20 v.-c.'s. Nine of these are only known to occur in one v.-c. each; but over one-third of the remaining 104 are found in more than 10 v.-c.'s, and 19 of them in from 15 to 20 v.-c.'s. These last are, as a rule, among our most strongly marked species and subspecies, and within the next few years they will surely be found in other v.-c.'s.

The 9 forms which thus far are known from only 1 v.-c. each are—*R. durescens*, *mercicus*, *orthoclados*, *macranthelos*, *Lejeunei*, *nemorosus* (Genev.), *Durotrigum*, *tereticaulis*, and *rubriflorus*. Of these, one, *R. mercicus* (once locally abundant near Birmingham), now seems in danger of extinction; while three more, *macranthelos*, *Lejeunei*, and *tereticaulis*, though all occurring in more than one locality, seem abundant nowhere.

The following is a list of new comital records of Rubi made since the publication of my *Handb. Brit. Rubi* in July, 1900, *in addition to others published in the interval* in this Journal and in *Irish Topographical Botany*. In this list the county or vice-county is represented (except in the case of Irish records) by its number in Watson's *Topographical Botany*, followed by the locality, the name of the collector, and (where possible) the year in which the plant was collected; the sign ! at the end implying that I have seen specimens. When I have myself been the collector, no name will be found after the locality. Where records are enclosed in square brackets, confirmation is desired.

Rubus idæus L. var. *obtusifolius* (Willd.). 93. Wood near Longside Railway Station, *Prof. Trail*, 1901!

R. fissus Lindl. 13. St. Leonard's Forest, *J. W. White*, 1898! 24. Heath, *G. C. Druce*! 30. Salford, *Druce*, 1901! 72. Near Moffat, *C. Bailey*, 1898!

R. suberectus Anders. 13. St. Leonard's Forest, *White*, 1900! Co. Down, by Castlewellan Lake, *S. A. Stewart*, 1893!

R. Rogersii Linton. 10. Near Apse Castle Wood, 1901. 80. Ayton to Cairncross, *Bailey*, 1900! 94. By River Fiddick, Boharm, *Trail*! 99. Arrochar to Tarbet, *Marshall*! 100. Near Rothesay, Bute, *Marshall*, 1900! 107. Near Invershin, *Marshall*, 1890.

R. plicatus Wh. & N. 13. Aldworth, 1900. 61. Skipwith, *H. J. Wilkinson*! [65. Croft, *J. Dalton*!] 74. Near Stranraer, *F. A. Rogers*, 1901! (confirms previous uncertain record). 94. Alvah, *Trail*, 1901! Co. Kilkenny, Craigue, *R. A. Phillips*, 1900 (type or var. *hemistemon*)! Kerry, Killarney, *Druce*, 1901!—[Var. *hemistemon* (P. J. Muell.). Kerry, Muckross, *Druce*, 1901!]

R. nitidus Wh. & N. 10. The Wilderness, 1901. 13. Fittleworth, *Linton & Marshall*, 1901!

R. affinis Wh. & N. var. *Briggsianus* Rogers. 12. Andover to Winchester, *W. L. Eyre*, 1900!

R. integribasis P. J. Muell.? 6. Castle Orchard, *Linton*! 12. Woolmer Forest border, 1900. [61. Skipwith, *Wilkinson*!]

R. holerythros Focke. 12. Near Liphook, 1900.

[*R. latifolius* Bab. 92. Near new Bridge of Don, Aberdeen, *Trail*, 1901!]

R. carpinifolius Wh. & N. 5. Porlock, *R. P. Murray*! 32. Harleston, *Druce*, 1901! 61. Skipwith to Selby, *Wilkinson*!

R. incurvatus Bab. 27. Sprowston Common, *E. F. Linton*! Co. Antrim, by River Bush, Bushmills, *Stewart*!

R. erythrinus Genev. 13. Linchmere, 1900.

R. rhamnifolius Wh. & N. 30. Heath, *Druce*! — Subsp. *Bakeri* F. A. Lees. 37 (? or 40). Bewdley, *E. G. Gilbert*! 59. Heaton, *W. Moss*, 1901! Co. Down, Killough, *C. H. Waddell*!

R. nemoralis P. J. Muell. 37 (? or 40). Bewdley, *Gilbert*!

R. Scheutzii Lindeb. 73. Near Dalbeattie, *Bailey*, 1899!

R. dumnoniensis Bab. 1. The Lizard, *W. O. Focke*, 1889. 10. Headon, *F. Stratton*! 100. Near Rothesay, Bute, *Marshall*, 1900!

R. pulcherrimus Neum. 19. Clacton-on-Sea, *W. Whitwell*! 32. Whitley, *Druce*! 64. Plompton, Knaresborough, *Wilkinson & Fisher*, 1900! Co. Kerry, Killarney, *Druce*, 1901!

R. mercicus var. *bracteatus* Bagnall. 49. Near Bettws-y-coed, *Murray*!—Var. *chrysoxylon* Rogers. 36. King Wood, *Ley*!

R. villicaulis Koehl. 93. Base of Mormond Hill, Strichan, *Trail*, 1900! — Subsp *Selmeri* (Lindeb.). 10. Bleak Down, 1901. 13. Near Bosham, *Marshall & Salmon*, 1901! 17. Netley Heath, *C. E. Britton*, 1900! 61. Skipwith, *Wilkinson*, 1900! 64. Scotton Bank, Knaresborough, *Fisher*, 1900! (confirmatory). 73. Dalbeattie to Urr, *Bailey*, 1899! — Subsp. *calvatus* Blox. 13. Petworth, 1901. 61. Langwith, *Wilkinson*!—Subsp. *rhombifolius* Weihe. 13. West Chillington Common, *White*, 1898! [16. Eltham Common, *Wolley-Dod*!] 21. Hampstead Heath, 1900. 24. Stoke Common, *Benbow*, 1900!

[*R. sciaphilus* Lange, 42. Grwyne Valley, *Ley*, 1901!]

R. leucandrus Focke. Record for v.-c. 5 should be cancelled. 10. Parkhurst Forest, 1901. 13. Shottermill Common, 1900.

R. thyrsoideus Wimm. 12. Hassock Copse, *Eyre*, 1900! 13. Hailsham to Hempstead, *Roper*! 14. St. Leonard's-on-Sea, 1900. 23. Cuddesdon, *F. A. Rogers*, 1901! 61. Kelsey gravel-pits, Hull, *C. Waterfall*!

R. argentatus P. J. Muell. Co. Cork, Sherkin Island, *Phillips*, 1901!—Var. *robustus* (P. J. Muell.). 10. Apse Castle Wood, 1901. 12. Near Liphook, *F. A. Rogers*, 1900! 63. Near Doncaster, *H. H. Corbett*, 1901! 64. Abbey Field, Knaresborough, *Fisher*, 1900!

R. silvaticus Wh. & N. 12. Preston Copse, *Eyre*! 34. Lydbrook, *Ley*!

R. lentiginosus Lees. 13. Lavington Common, *Linton & Marshall*, 1901! Record for v.-c. 40 should be cancelled, and 58 substituted.

R. macrophyllus Wh. & N. 13. By Graffham Down, 1901 (confirmatory). 44. Llandevarn, *Ley*!—Subsp. *Schlechtendalii* (Weihe). 19. Norton Heath, *Britton*, 1900! 23. Cuddesdon, *F. A. Rogers*,

1901 ! [61. Skipwith, *Wilkinson* !] 64. Near Goldsborough Mill, Knaresborough, *Fisher*, 1900 !

R. Questierii Lefv. & Muell. [Dublin, Dalkerry, *Druce*, 1901 !] 36. Rigg's Wood, *Ley* !

R. Salteri Bab. 13. Midhurst Common, 1901. 14. Near St. Leonard's-on-Sea, 1900. 24. Heath, *Druce* !

R. Colemanni Blox. 11. Bishopstoke, *J. Groves*, 1878 ! (confirmatory). 12. Near Liphook, 1900. 16. Tunbridge Wells, *D. C. O. Adams*, 1892 !

R. micans Gren. & Godr. 12. Woolmer Forest, 1900. 27. Sprowston, *Linton*. 58. Near Petty Pool, *Bailey*, 1899 ! (confirmatory). Co. Kilkenny, Copenagh, *Phillips*, 1901 !

R. hirtifolius P. J. Muell. var. *mollissimus* Rogers. 10. Parkhurst Forest, 1901. 35. Buckholt, *Ley* !

R. pyramidalis Kalt. 13. Shottermill Common, 1900. 21. Hampstead Heath, 1900. 59. Park Clough Wood, Bolton, *Moss* ! 70. Near Carlisle, *Mrs. Allison*, 1901 ! [Co. Kilkenny, Copenagh, *Phllips* !]

R. leucostachys Schleich. 28. Beetley, *Linton*. 61. Skipwith, *Wilkinson* !— Var. *gymnostachys* (Genev.). 17. Haslemere, 1900.— Subsp. *leucanthemus* P. J. Muell. ? 16. Warwick Park, Tunbridge Wells, *Gilbert* !

R. lasioclados Focke. 37 (? or 40). Bewdley, *Gilbert* ! — Var. *angustifolius* Rogers. 10. Bleak Down, 1901. 13. Linchmere to Fernhurst, 1900.

R. criniger Linton. 12. Ellisfield to Preston, *Eyre* !

R. Boræanus Genev. 35. Llangattock, *Ley* !

R. cinerosus Rogers. 37. Little Malvern, *Ley* ! 98. Dalmally, *Marshall*, 1893 ! West Galway, Clonbur, *Marshall* !

R. mucronatus Blox. 59. Ince Blundell Wood, *Wheldon*, 1900 ! [60. Knott End, *Wheldon* !] 61. Skipwith Common, *Wilkinson* ! 94. Cruden, *Trail*, 1901 ! — Var. *nudicaulis* Rogers. 10. Marvel Copse, Newport, 1901.

R. Gelertii Frider. 16. Tunbridge Wells, *Gilbert* ! 55. Charnwood Forest border, *Linton*, 1898 ! (confirmatory). [60. Preesall, *Wheldon* !].

R. anglosaxonicus Gelert. 55. Charnwood Forest border, *Linton*, 1898 ! (forma). — Subsp. *curvidens* A. Ley. 35. Tintern, *Druce* !— Subsp. *vestitiformis* Rogers. 16. Ryarsh Wood, 1896 (forma). 35. Buckholt, *Ley* ! 42. Glyn Collwng, *Ley* !

R. melanoxylon Muell. & Wirtg. 16. Crown Wood, Shooter's Hill, *Wolley-Dod* ! 93. Aberdour, *Trail*, 1901 ! 94. Gamrie, *Trail*, 1900 !

R. infestus Weihe. 94. Rinn of Afforsk, Gamrie, *Trail*, 1900 !— Var. *virgultorum* A. Ley. 42. Ystal-y-fera, *Ley* !

R. Borreri Bell Salt. 13. Little Bury Wood, Lavington, 1901. 58. Mate's Lane, *Wolley-Dod* ! (forma). Co. Kilkenny, Copenagh, *Phillips*, 1901 !—Var. *dentatifolius* Briggs. 35. Tintern, *Ley* !

R. Drejeri G. Jensen. [6. Peat Moor, Shapwick, *H. S. Thompson*, 1889 !] —Subsp. *Leyanus* Rogers. 61. Bridlington to Sowerby, *Fisher* !

R. radula Weihe. 80. Lessudden, *Bailey*, 1898! 81. Ayton to Cairncross, *Bailey*, 1900! 93. Aberdour, *Trail*, 1901! 94. Near Melrose, *Trail*, 1900. — Subsp. *anglicanus* Rogers. 10, Parkhurst Forest, 1901. 13. Near Bosham, *Marshall*, 1901! 21. Hampstead Heath, 1900. — Subsp. *echinatoides* Rogers. 9. Combe Aylmer, *Murray*! 32. Harleston, *Druce*, 1901! 92. By River Dee near Aberdeen, *Trail*!—Subsp. *sertiflorus* (P. J. Muell.). 98. By Loch Long, *Marshall*! 101. Near Inverneil, *C. E. Salmon*!

R. echinatus Lindl. 13. Shottermill Common, 1900.

R. rudis Wh. & N. 40. Farley Dingle, *Painter*, 1901!

R. oigocladus M. & L. var. *Newbouldii* (Bab.)? 16. Tunbridge Wells, *Murray*! 42. Aber-clydach, *Ley*!

R. regillus A. Ley. 58. Wood between Chelford and Alderley Edge, *Bailey*, 1898!

[*R. podophyllus* P. J. Muell. Co. Wicklow, Glendalough, *Druce*, 1901 !]

R. Griffithianus Rogers. 3. Knighton Heath, 1881 (forma). 36. Carey Wood, *Ley*! 44. Llandebie, *Ley*!

R. Babingtonii Bell Salt. 10. Wootton Creek, 1901. — Var. *phyllothyrsus* (Frider.). 24. Near Beamond End, *Britton*, 1900!

R. mutabilis Genev. 24. Near Beamond End, *Britton*, 1901! Co. Kerry, Killarney, *Druce*, 1901!

R. Bloxamii Lees. 5 (? or 6). Penridge, *Murray*, 1892!

R. fuscus Wh. & N. 13. Midhurst Common, 1901.—Var. *nutans* Rogers. 10. Parkhurst Forest, 1901, 13. Lavington, *Marshall*, 1901! 36. Ivington, *Ley*, 1900!— [Var. *macrostachys* P. J. Muell. 59. Walton, *Wheldon*, 1900!] —Subsp. *obscurus* (Kalt.). 13. Madehurst, *Linton & Marshall*, 1901!

R. pallidus Wh. & N. 23. Chinnor Hill, 1894. — Var. *leptopetalus* Rogers. 12. Woolmer Forest, 1900. 39. Streetley, *Bagnall*!

[*R. thyrsiger* Bab. 5. Cockercombe Drive, Quantocks, *Thompson*! 24. Penn Wood, *Britton*, 1901!]

R. foliosus Wh. & N. 10. Marvel Copse, 1901. 93. By Ythan-in-Methlick, *Trail*, 1900! 94. Near Bridge of Alvah, *Trail*, 1900! The first Scottish records.

R. rosaceus Wh. & N. var. *hystrix* (Wh. & N.). 24. Heath, *Druce*! 30. Whistley, *Druce*! 63. Near Doncaster, *Corbett*!— Subsp. *infecundus* Rogers. 10. Pan, Newport, 1901. 13. Petworth, 1901.

R. fusco-ater Weihe. 36. Welsh Newton, *Ley*! (confirmatory).

R. Koehleri Wh. & N. 13. By Hammer Ponds, *White*, 1900!— Subsp. *dasyphyllus* Rogers. 59. Heaton, *Moss*, 1901! 73. Dalbeattie to Urr, *Bailey*, 1899! Co. Kilkenny, Copenagh, *Phillips*, 1901!

R. Marshalli Focke & Rogers, var. *semiglaber* Rogers. 41. Llwydcoed, *Riddlesdell*!

R. Bellardii Wh. & N. 13. Popple Hill, Graffham, 1901.

R. serpens Weihe. 12. Woolmer Forest, 1900.

[*R. hirtus* W. & K. 24. Black Park, *Benbow*!] — [Subsp. *flaccidifolius* (P. J. M.). 42. Erwood, *Ley*!]

R. acutifrons A. Ley. [5. Near Burnworthy, Blackdown, *Murray*!]

12. Micheldever Woods, *Eyre*, 1900! 35. Llangattock, *Ley*! 41. Glyn Neath, *Ley*!

[*R. tereticaulis* P. J. M. Co. Cork, Ballyvodock, *Phillips*, 1900!]

R. ochrodermis A. Ley. 80. Lessudden, *Bailey*, 1898! The Somerset records (5 and 6) are open to some question.

R. dumetorum Wh. & N. (sp. coll.). 13. Rogate, 1900. — Var. *ferox* Weihe. 29. Wicken Fen, *H. H. Slater*, 1901!—Var. *britannicus* Rogers. 34. Symond's Yat, 1892.

R. corylifolius Sm. (sp. coll.). 93. Kinloch, St. Fergus, *Trail*, 1900! — Var. *cyclophyllus* (Lindeb.). 17. Wandsworth Common. 61. Kelsey gravel-pits, Hull, *Waterfall*! 93. Tyrie, *Trail*, 1901!

R. Balfourianus Bab. Co. Monaghan, Benmount, *Waddell*, 1900!

R. cæsius L. 13. Rogate, 1900.

NEW BRITISH HEPATICÆ.

By Symers M. Macvicar.

Lepidozia trichoclados C. Müll. in Hedwigia, 1899.—This is the plant mentioned in *Hepaticæ of the British Isles* as a form of *Lepidozia setacea*, gathered by Mr. Pearson and Dr. Carrington at Festiniog, but Mr. Pearson now considers it a good species. A full account of this species, with differential remarks between it and *L. setacea*, with plate, will be found in Herr Müller's paper in *Hedwigia*, 1899, p. 197. The chief distinguishing characters between the two plants lie in the female inflorescence. In *L. trichoclados* the inner bracts are ovate, bidentate, with the lobes more or less toothed, and the mouth of the perianth is dentate, while in *L. setacea* these bracts are laciniate and ciliate, and the mouth of the perianth is longly ciliate. When fruit is present in *L. setacea*, the mouth of the perianth is widely open, but in *L. trichoclados* with fruit it is only as large as the diameter of the fruit-stalk. Müller gives the fruiting time of *L. setacea* as June–July, and for *L. trichoclados*, November; the latter species apparently being found much more frequently in fruit than the former. Perianths may be looked for at any time in *L. trichoclados;* I have found them in some quantity at the present time (March). It is doubtful how far the two species can be distinguished in the barren state. *L. trichoclados* has the stems pinnate and bipinnate, the branches being nearly at right angles to the stem. In *L. setacea* the stems are irregularly branched, with the branches ascending. Members of the Moss Exchange Club who received specimens distributed in 1898, labelled "*Lepidozia setacea* Moidart, 12.4.97," gathered by me, will see what is doubtless *L. trichoclados* in its barren state. It is a form in which the leaves have more frequently than usual only one row of cells. The new species bears little resemblance to the compact form of *L. setacea* of drier ground, with its imbricated and closely incurved leaves; it more resembles the lax forms, with rather spreading leaves, of shady places. In Moidart, West

Inverness, where it is frequent, if not common, it occurs on moist banks, preferably peaty, which are shaded by rocks or trees, and is accompanied with *Lepidozia reptans*, *Cephalozia lunulæfolia*, *Kantia trichomanis*, *Mylia Taylori*, *Jungermania minuta*, *Thuidium delicatulum*, *Sphagnum*, etc. On one bank it can be seen as a compact form on peat, and at the side of this as a very lax form creeping up *Sphagnum*. This compact form has not got the closely imbricated and much incurved leaves of the compact form of *L. setacea*. As *L. trichoclados* has only been recently distinguished as a species, its distribution is little known as yet. It has been found in Middle Europe, is more frequent in Western Norway than is *L. setacea*, and it is certainly not rare in Moidart. It will doubtless be found to be generally distributed over the west of Britain at least, and in Ireland.

JUNGERMANIA HETEROCOLPOS Thed.—On a moist rocky bank, Craig an Lochain, Killin, alt. 1700 ft., June, 1901. Confirmed by B. Kaalaas. This species can be distinguished from any others of the *Müllleri* group by the apex of the stems being elongated through the deformed gemmiferous leaves. It occurs on the Continent and in North America.

J. ATLANTICA Kaalaas in Beiträge zur Lebermoosflora Norvegens, 1898. Dirlot, Caithness, 20.8.1901, gathered by the Rev. David Lillie, Watten. Confirmed by Herr Kaalaas, who writes of this plant: "I do not hesitate to declare it to be my *Jung. atlantica*, though it exhibits some differences from the original plant, but I think they are only slight. The lobes of the leaves in the Scottish plant are mostly three in number, and often more obtuse than in my original; but in other respects I cannot find any difference." In his "Beiträge" a doubt is expressed whether this plant be a distinct species or a variety of *J. gracilis;* and in a letter received last year, this doubt was again mentioned. It differs from *J. gracilis* in the absence of any attenuated stems, and its distribution as far as known is entirely western. In Norway it has been found near Stavanger and on the island of Stördo, and it has also been found on the Faroë Isles by Herr C. Jensen. The leaves are very frequently only 2-lobed, and are very concave, the plant having a good deal the appearance of *J. saxicola*. *J. atlantica* is one of several interesting plants found in Caithness by Mr. Lillie.

MARSUPELLA CONDENSATA (Angstr.) Kaalaas *non* Lindb.—On bare moist humus, Ben Lawers, alt. 3200 ft., June, 1901. Determined by B. Kaalaas. This rare species occurs in quantity above Lochan Chait, on the side of Ben Lawers which faces the north. This part of the hill has little vegetation, which is almost confined to small pieces of *Marsupella* and *Acolea* with *Conostomum boreale*. A description, with excellent figures of the plant, will be found in the above-mentioned "Beiträge." The lunate sinus and incurved lobes of leaf, without any hyaline border, are characteristic marks of this species, so much so, that from recollection of Kaalaas's figures I labelled my plant on the hill as this; but on examination at home, I thought it must be too large for this species. Herr Kaalaas

writes, however, that although the specimens are unusually luxuriant, he has seen similar ones from a few places in Norway. He considers this species to be the same as *Marsupella æmula* (Limpr.), with which opinion Prof. V. Schiffner mentions that he is in agreement. Lindberg had mistaken some other plant for Angström's, as is shown in Kaalaas's "Beiträge." This species has only been found elsewhere sparingly in the Scandinavian and Austrian Alps.

Aneura incurvata (Lindb.).—On moist loamy ground. Pease Dene, Berwickshire, June, 1901; female plant. Determined by W. H. Pearson. This critical species was first described by Lindberg in *Musci Scandinavici*, and has recently been investigated by Prof. Schiffner in "Lotus," 1900. In this latter paper there are full remarks on the comparative differences between this plant and the other European species. It is also represented in his *Hepaticæ Europeæ Exsiccatæ*, Series I., issued last year. It is dioicous, as with *A. pinguis*, but is more closely related to *A. multifida* and *A. sinuata* according to Prof. Schiffner. The calyptra is very rough; the frond varies from being nearly simple to much branched and is channelled, semilunar in section, and five cells thick, the outer cells of the dorsal side being almost as large as the inner cells. The main stem has a one-celled margin, which is more distinct on the branches when it is one to two cells broad. This species has been found in Austria, Germany, and Scandinavia, and when better known will no doubt be found in other parts of Britain.

SHORT NOTES.

Centaurea nigra and C. Jacea. — Mr. F. N. Williams, in his *Prodromus Floræ Britannicæ*, pp. 57-61, relies on the presence or absence of pappus to separate these species, and in consequence has referred to the latter a number of specimens considered by other botanists to belong to the former. We cannot agree with Mr. Williams in this view, our experience being that *C. nigra* is variable in this character. The examination of a large series of specimens collected on the chalk downs near Clandon, Surrey, shows a number with the fruits having the usual well-developed regular crown of pappus-scales, a number with fruits without such crown or with a very few rudimentary scales only visible under the microscope, while in a few cases the crown is composed of a number of very unequal scales. On the Continent there are plants intermediate between *C. nigra* and *C. Jacea*, notably *C. pratensis*; but in this country we believe the two plants are separable by the very different phyllaries. No doubt it is tolerably easy, as Mr. Williams suggests, to sort single specimens in herbaria on the pappus or no pappus character, but we fear that after spending an hour or two in examining the *C. nigra* on the chalk downs he would not feel so well satisfied with the result.—H. & J. Groves.

The Dating of Periodicals.—I write to express my appreciation of the article on "Periodical Publications," which appeared in the

Journal of Botany for July last. I believe it to be a timely presentation, and I hope that it may call the attention of certain editors to things which they have not thought of. The fact is, many editors of botanical periodicals have not had any training in form in printing. Incidentally I wish also to call your attention to the custom of the *Botanical Gazette* in reference to the dates of issue. You rightly said that our date is on the first page of the advertisements, and disappears in the bound volume. You did not happen to catch the fact that in order to avoid this disappearance we print the list of dates of publication at the end of the "Table of Contents" of each volume, so that it may be permanent. Perhaps this is not the best way, but I thought that you ought to know that we have done something in the way of making the record of dates a permanent one.—JOHN M. COULTER.

NOTICES OF BOOKS.

Genera Siphonogamarum ad Systema Englerianum conscripta ab autoribus Dr. C. G. DE DALLA TORRE *et* Dr. H. HARMS. Fasciculus Quartus. 4to, pp. 241–320. Lipsiæ: Engelmann. 6 marks.

Index Kewensis Plantarum Phanerogamarum Supplementum Primum Nomina et Synonyma omnium Generum et Specierum ab initio anni MDCCCLXXXVI *usque ad finem anni* MDCCCXCV *complectens confecerunt* THEOPHILUS DURAND *et* B. DAYDON JACKSON. [Pars i. A—Cymb. 4to, pp. 120.]

WE noticed in this Journal for 1900 (p. 362) the general plan and scope of the important contribution to nomenclature which Drs. Dalla Torre and Harms have undertaken, and are glad to chronicle its progress, which, if not rapid, is probably as steady as the exigencies of the case allow. Seldom, if ever, has more information been given in smaller space; we have a complete synonymy of genera, with a bibliography of each, which, whenever we have had occasion to test it, has almost always proved accurate and sufficient. *Edwardia* Raf. (given as a synonym for *Cola*, and substituted for the latter by Mr. Hiern (Welw. Cat. i. 84) on the ground of priority, dates from 1814, not "1824"; Mr. Hiern also correctly dates the institution of *Dombeya* and *Assonia* from Cav. Diss. ii. (1786), where they are enumerated and described in an appendix (unpaged) of "Genera elucidanda in Tertia Dissertatione." Whether the "fifty years' limit" which forms part of the "systema Englerianum" be accepted or not, the vast amount of information here compressed into the smallest possible compass cannot fail to be of the greatest service to systematists, who will of course use their own judgment as to accepting or rejecting the arbitrary standard set up at Berlin.

One name in this last instalment has no claim to inclusion, although it finds place in the *Index Kewensis*. This is "*Launzan* Buch. Ham. in Asiat. Research. v. (1799) 123." The title of Buchanan's paper is "Description of the Tree called by the

Burmas *Launzan*"; and he is careful not to adopt this vernacular name as a genus: "I believe it will be found to constitute a new genus; but I do not venture to give it a name, till the European botanists have ascertained whether or not it be reducible to any known genus of plants."

The first thing that strikes us about the initial instalment of the much-needed Supplement to the Kew Index is the inadequacy of the information supplied by its cover. This gives neither price, date, nor place of publication; indeed, there is no evidence that it has been published. But as a copy was received in the Department of Botany through a bookseller on the 11th of February, it may be assumed that it was issued to the trade a little before that date; and the circular which was sent out in advance of publication tells us that the Supplement will be issued in four parts, at the subscription price of 54 francs, post free, and that it may be obtained from M. Durand at the Brussels Botanic Garden.

One or two improvements have been introduced into the Supplement, which of course in its main lines follows those of the *Index Kewensis*. The date of publication is given in every case, and for plants published in out-of-the-way periodicals an additional reference is, when possible, added to the original.

The bulk of the Supplement is enormously increased by the wholesale manner in which names have been bestowed by Dr. Kuntze, to whom the editors thus refer in their circular:—"L'apparition de la *Revisio Generum* du Docteur Otto Kuntze, a amené une perturbation profonde dans la nomenclature. Le réformateur allemand, et ceux qui l'ont plus ou moins suivi, ont mis en circulation plus de *quarante mille* noms nouveaux. Partisans et adversaires de ces innovations ont intérêt à retrouver rapidement les noms proposés." It is now for the first time that one is able to realize the results of Dr. Kuntze's method, and it must be admitted that they justify the misgivings which have been expressed in these pages and elsewhere as to the effect of transferences made on purely literary grounds. The genus *Oxalis*, for example, is superseded by "*Acetosella* Moehr. (Prim. Lin. Hort. Priv. 4) (1736)," and Dr. Kuntze forthwith renames under *Acetosella* every *Oxalis* with which he is acquainted. Most of these are merely homonyms, and are run together in the Supplement into one paragraph—a plan for some reason not adopted under *Acinodendron* (substituted for *Miconia*), which consequently occupies more than seven columns! Even when thus run together, the homonyms under *Acetosella* occupy the best part of a column, and are followed by some which need to be treated separately, as Dr. Kuntze has in certain instances changed the trivials, and in others has duplicated them: *e. g.*

"*comosa* Kuntze l. c. 91 = O. comosa E. Mey.
comosa Kuntze l. c. 92 = O. comosa Prog."

This is the natural consequence of transferring names without looking into the botany of the matter; common sense as well as modesty suggests that such wholesale renaming should only be

undertaken by monographers, except in so far as they come in the natural course of a more limited investigation.

It is to be regretted that, owing to the inaccuracy of the dates persistently given by certain periodicals as those of issue, plants are included in this *Supplement* which have no claim to a place therein. When, in 1896 (p. 169), we gave the first of the lists showing the actual dates of the publication of the *Kew Bulletin*, since continued on the completion of each volume, we pointed out that the number dated December, 1895, "was not issued until January, 1896, and that the new species it contained would probably be included in any list of novelties for 1895." This has now actually happened, for we find cited in the Supplement from this very number *Conyza cylindrica* and *C. stenodonta* of Baker, and *Caralluma arabica* N. E. Br.—plants which were not published within the decade, and should not be included in the volume. We would suggest to the compilers the advisability of consulting the lists of dates for the *Bulletin* already given in these pages; as it may be convenient for others to note them, we give the references :—

Kew Bulletin,	"1895."	See Journ. Bot.	1896, 169.
,, ,,	"1896."	,,	1897, 451.
,, ,,	"1897."	,,	1898, 239.
,, ,,	"1898."	,,	1899, 399.
,, ,,	"1899."	,,	1901, 355.
,, ,,	"1900."	None yet published.	
,, ,,	"1901."	Not yet completed.	

In the interests of science each volume of the *Bulletin* should contain on the back of the title a list of the dates at which each number was issued; failing this it might be well to copy into each volume the information supplied in these pages: it is only by some such method that the mischief of false dates can be rendered comparatively innocuous.

We note that a somewhat large number of hybrids are introduced; this is not without precedent in the *Index*, and there is something to be said for their inclusion, but we doubt whether on the whole it is desirable. Another innovation is the appending of the authority to the names to which a synonym is reduced; *e.g.*:

"*crotonoides*, Pierre = Chrysophyllum crotonoides, *Klotzch*."

The plan of the *Index*, in which the authority was only appended when the same name was retained for two species, neither being reduced, seems to us preferable, and in some instances would save space—an important matter in a book of this kind.

Omissions, so far as we have tested them, are very few. No notice, however, seems to have been taken of the *Hand-list* of the Kew Arboretum, the first part of which is dated—we believe correctly—1894. This is a more serious omission than appears at first sight, as, although the list is merely one of names, it is, according to the *Kew Bulletin*, "universally accepted as a standard authority for nomenclature." In the genus *Cratægus* alone, at least twenty-five names appear in the *Hand-list* which find no place either in the *Index* or the *Supplement*. It is true they are for the

most part synonyms and garden names, but such are not excluded from the *Index*, at any rate in all cases. "*Cratægus Korolkowii* Hort." is retained in the *Hand-list* as a species (from "Central Asia"); and one would think that names published and used at Kew would have a special claim to appear in the Kew *Index*. Individual examples of omission are *Asclepias stockenstromense* Schlechter in Journ. Bot. 1895, 337 (*Xysmalobium stockenstromense* Scott Elliot); *Carex Hudsonii* Arth. Bennett in London Catalogue, ed. 9, p. 41, n. 1681 (1895) (see Journ. Bot. 1895, 188); *Cycas Taiwaniana* Carruthers in Journ. Bot. 1893, p. 2, t. 330.

Typographical errors, from which the *Index* was commendably free, are somewhat unduly prominent in the *Supplement:* e.g. the two names under *Capitanya*, printed "rogieoides" and "ostegioides," should be "rogleoides" and "otostegioides": a comparison of the references suggests that these are identical, the former being a *nomen nudum*. If the practice of entering such misprinted names, with "sphalm." affixed, be continued, it is to be feared that the *Supplement* will include among its errata a number of its own making.

It remains to express a hope that the remainder of the *Supplement* will be issued with all possible despatch. The present instalment, owing to numerous and doubtless unavoidable difficulties, has had a tedious passage through the press; it is to be hoped that all obstacles to more rapid publication have been overcome. Meanwhile it is satisfactory to know that the tedious but most useful work is being carried on. Mr. S. T. Dunn has completed the five years from 1896 to 1900, thus bringing the enumeration down to the end of the last century, and is proceeding with the work for the present century. This is already being done by the "Index Botanique Universel," issued with the *Bulletin de l'Herb. Boissier*, which gives a separate slip for each new name published during 1901; each slip is detachable, and the whole can be arranged either alphabetically or systematically. Mr. B. D. Jackson is preparing a supplement to the original *Index*, in which will be given the necessary introduction and explanations, the omission of which has marred the completeness of his work.

J. B.

P. Bubani: *Flora Pyrenæa*, vol. iv. pp. 446 and indexes. Hoepli, Milan. MDCCCCI.

This volume concludes the work, the publication of which began in 1897; it contains the monocotyledons and vascular cryptogams, the former with 159 genera and 567 species; the latter with 26 genera and 57 species. In Gautier's *Cat. Rais. Fl. Pyrénées-Orientales* (1898) there were enumerated 479 species of monocotyledons. The four volumes of Bubani's Flora together contain 130 natural orders, 774 genera, and 2825 species, occupying 2111 large octavo pages. There were 2675 species (including the hybrids) in Gautier's Catalogue; in Bubani the proportion of the number of species of monocotyledons to that of dicotyledons is nearly as 17 to 66, or more nearly as 110 to 427. No new genus or species is

described in the present volume, and only one new species in the whole book. In *Liliaceæ* he maintains his genus *Morgagnia* (p. 109) for *Simethis;* he quotes the reference to the name as his Sched. Critic. Cent. (10 May, 1842), p. 6, n. 33, printed at Bologna in 1843; the reference to *Simethis* is Kunth, Enum. Plant. iv. p. 618 (1843), published, he says, in 1844. Bentham, in Benth. & Hook. f. Gen. Pl. iii. p. 784 (1883), sank Bubani's name for want of accompanying character, the reference given being "Bubani in Nuov. Ann. Sc. Nat. Bologna, ix. (1843), 92."

Bubani in the place last cited was sufficiently precise in identifying the plant which he intended; he wrote "Morgagnia, Nobis —*M. bicolor*, Nob. *Bulbine planifolia*, Spr. Syst. Bertol. Fl. cum synonymis," etc.; the synonymy in Bertol. Fl. Ital. iv. p. 137 (1839) is as full as any one could reasonably desire, and with it is a long description. In the opinion of many modern botanists it is not necessary, in order to establish a generic name, to supply with it a generic character, provided that a description, either directly or by reference, is given of the typical species. On this principle the name *Morgagnia* can take rank from the date of Bubani's paper last cited, which certainly seems earlier than that of Kunth's Enum. Plant. iv. The date of the latter is sometimes in error quoted as of the year 1841, perhaps on account of a foot-note to page 1, to the effect that the printing of the first Order in it was begun in June, 1841; but on page 664 a citation is given from "Hook. London Journal of Botany, no. 4, Apr. 1842," and there is plenty of internal evidence of a like kind; also the title-page bears the date of 1843, and moreover there remains Bubani's statement that the volume was published in 1844. Some botanists have rejected the name *Morgagnia*, on the ground that in sound it too closely resembles that of the Scrophulariaceous genus *Morgania* R. Br. (1810); there are, however, instances where similar, or but little differing, generic names are permitted to stand at the same time, as *Boschia*, *Boscia*, *Bosia*, etc., etc.

As in the previous volumes, there are many new names both for genera and species given in lieu of others thoroughly well established and properly sanctioned in accordance with generally accepted principles; samples of such innovations have been instanced in the notices of volumes i.–iii.; one more case may be enough to mention.

Dactylis Royen Fl. Leyd. Prodr. p. 56 (1740), was adopted by Linnæus in the second edition of his *Genera Plantarum* (1742); and in the first edition of his *Species Plantarum* (1753) he named two species, one of which was long ago removed to the genus *Spartina* Schreb. (1789); the other species is the common cocksfoot grass, *Dactylis glomerata*. Bubani's objection against *Dactylis* for this grass is not based on the ground that Linnæus confused two generic types, but that he made a perverse use of the name, which in strictness, according to Pliny, signifies a finger's length, and therefore is unsuitable; he admits that Adanson, in 1763, used the name *Amxythis* (*Amaxias*) of Theophrastus in substitution for *Dactylis*, but he is not satisfied with this identification, and thinks that another name is wanted. He notes that the English name is

Orchard-grass (a name still used in North America), which implies that the grass grows in plantations of apple-trees, as indeed it does, though it is not less frequent in meadows and hedges; he would on this account have coined for it the name *Orchardia*, after the analogy of *Salicaria* of Tournefort, etc., had he not been afraid of bitter criticism; eventually he made the new name *Trachypoa*, in reference to the comparative roughness of the grass, and its botanical relations; thus (p. 359) the genus appears under this name and the species as *T. vulgaris* Bub., accompanied with copious references and synonymy ranging from Dalechamp down to Asa Gray.

The composition of the work occupied forty years; the first draft was completed Feb. 5th, 1856, followed by five years of general revision. It was first concluded Dec. 15th, 1873; further revised Feb. 13th, 1875; and finally settled by the author July 25th, 1880, rather more than eight years before his death. The editor, Professor O. Penzig, of Genoa, has faithfully carried out the express wishes of the author in offering to the public this laborious work in all its originality.

W. P. Hiern.

The Genus Halimeda. By Ethel Sarel Barton. (Siboga-Expeditie. Edited by Dr. Max Weber. Brill, Leiden.)

Embedded in the excellent series of monographs—the outcome of his remarkably successful expedition in the "Siboga"—edited by Prof. Weber, there is some danger of Miss Barton's admirable account of *Halimeda* being lost sight of by British botanical readers. It would be difficult to find among recent systematic work a more thoroughgoing piece of research. It combines a very faithful investigation of the early historical accounts of the species of *Halimeda*, rendered possible by the very noticeable characters of this generic type, with microscopic investigation of the characters of the species of the minutest kind, and carried out by the most modern methods of the laboratory. All this of course means little more than hard, conscientious work; but much more was demanded of the botanist who should essay the revision of a genus like *Halimeda*, which has been the despair of every phycologist for years. By minute, patient, unwearied investigation and re-investigation of minor characters, assiduous search for and examination of type-specimens, and denial of all evidence that was not first-hand, Miss Barton has conformed to the highest type of research in systematic botany.

The monograph is not only exhaustive as regards the descriptions and the ingenious revision, but in its quotations of synonymy reminds one of nothing so much as Rostafinski's "Mycetozoa" and Mrs. Weber's "Caulerpa." The plates are excellently reproduced.

The subject is treated under three headings: Historical, Morphological, and Systematic. The main point, upon which the revision of the genus is founded, is explained in the morphological part; it is based on the nature of the connection between the filaments of the central strand at the summit of each joint. This connection is established in one of two ways: either by direct communication by means of large open pits between all the filaments of the central strand, or by a fusion of the filaments in pairs or in

threes. These two groups are again subdivided, and in this way seven consolidated species are defined out of the twenty-two previously recognized. As might be expected, some of the species include a wide range of forms, the chief stages in the development of which are denoted by form-names. The complete series of intervening forms renders it impossible to allow to these chief stages the importance of being varieties.

G. M.

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*ARTICLES IN JOURNALS.**

Botanical Gazette (21 Feb.).—W. C. Coker, 'Gametophytes and embryo of *Podocarpus*' (3 pl.) — C. S. Sargent, 'New North American Trees.'—A. Eastwood, 'Plants collected at Nome City, Alaska.'—C. E. Preston, 'Two instructive seedlings' (*Erodium cicutarium* and *Amsinckia tesselata*).—C. E. Bessey, 'Morphology of pine cone' (1 pl.).

Botanical Magazine (Tokyo: 20 Jan.).—J. Matsumura, 'Japanese Rubi' (cont.). — Y. Uyeda, 'Ueber den 'Benikoji Pilz' aus Formosa' (cont.). — T. Makino, 'Flora of Japan' (cont.). — T. Yoshinaga, 'Some Fungi from Tosa.'

Bull. de l'Herb. Boissier (28 Feb.).—J. Grintzesco, 'Physiologie de *Scenedesmus acutus*.'—A. Chabert, 'Les *Euphrasia* de France' (cont.).—R. Chodat & E. Wilczek, 'Flore de la République Argentine.' — R. Chodat, 'Plantæ Hasslerianæ' (Paraguay: cont.). — J. Bornmüller, '*Nitella elata*.'—H. de Bossieu, *Viola Fargesii*, sp.n. —H. Christ, 'Spicilegium Pteridologicum Austro-Brasiliense.'

Bull. Torrey Bot. Club.—(25 Feb.) H. van Schrenk, 'Teaching of vegetable pathology.'—R. S. Williams, *Eurhynchium Tayloræ*. *Brachythecium Pringlei*, spp. nn. (2 pl.).—C. H. Peck, 'New Fungi.' —A. Eastwood, 'New Californian plants' (2 pl.). —E. S. Salmon, 'Notes on *Erysiphaceæ*.' — W. H. Long, 'New Texan Puccinias.'

Gardeners' Chronicle (1 March).—*Stapelia bella*, A. Berger, sp.n. (figs. 40, 41).

Journal de Botanique ("Fév.," received 10 March). — P. van Tieghem, *Setouratea*, *Campylospermum*, *Bisetaria* (genn. nov.: *Ochnaceæ*). — F. Guégnen, 'Anatomie du style et du stigmate des Phanérogames' (cont.).—A. de Coincy, 'Espèces critiques du genre *Echium*.'

Oesterr. Bot. Zeitschrift (March).—J. Celakovský, 'Ueber die inversen Placentarbündel der Cruciferen.' — F. Bubák, 'Einige Compositen bewohnende Puccinien' (cont.).—E. Zederbauer, 'Ueber Anlange und Entwicklung der Knospen einiger Laubmoose' (concl.: (1 pl.).—A. Plitzka, 'Zur Teratologie der Compositen.'—E. Hackel, 'Neue Gräser.'—J. Freyn, 'Plantæ Karoanæ' (cont.).—J. Velenovsky, 'Neunter Nachtrag zur Flora von Bulgarien' (concl.).

Rhodora (March). — E. D. Merrill, 'Notes on *Sporobolus*.' — G. E. Davenport, 'New England Ferns.'—R. G. Leavitt, 'Notes on *Lycopodium*.'

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* The dates assigned to the numbers are those which appear on their covers or title-pages, but it must not always be inferred that this is the actual date of publication.

BOOK-NOTES, NEWS, &c.

The fifth volume of the Botanical Transactions of the Yorkshire Naturalists' Union is devoted to *The Alga Flora of Yorkshire*, and is written by Messrs. W. & G. S. West. Of the 220 pages in this work, 209 are devoted to the systematic treatment; they are preceded by an introduction dealing shortly with the geology and topography of the county, as well as with the methods of collecting recommended by the authors. The total number of species recorded is 1044, of which 55 are new to Britain. Under each species are given the various localities in which it has been found. These are arranged under geographical subdivisions of the county, and in the case of critical species notes are appended pointing out diagnostic characters. A summary is given of the known algæ of Yorkshire, in the form of a table of classes, orders, and families, showing a total of 189 genera and 1044 species. An index of names completes the work.

We have received the second circular of the International Botanical Congress which it is proposed to hold at Vienna in 1905, when the numerous questions relating to nomenclature will be discussed. The British representatives on the Commission are Prof. Balfour, Mr. I. H. Burkill, Sir George King, and Dr. Rendle. Mr. Burkill has, of course, since left England, and we are not aware that Prof. Balfour has ever shown any special knowledge, or, indeed, has paid any special attention to the technicalities of the subject. We trust that it may yet be possible to add other names to the list: the omission of Mr. Hiern seems inexplicable, and others might be named, more qualified, we think, to deal with the subject than those selected. The same criticism applies to the list of names as a whole: moreover, it is by no means representative—Dr. Otto Kuntze's name does not appear; Germany is entirely unrepresented; and no Kew botanist is on the list. It can hardly be necessary to point out that the conclusions of a Conference which is not fully representative and from which experts are excluded are not likely to be accepted as binding; and we trust that the necessary steps will be taken to improve and augment the constitution of the Commission in order that the gathering may have some practical result.

The fifth part of the *Supplementum Universale*, forming vol. xvi. of the *Sylloge Fungorum*, has been issued by Messrs. P. A. Saccardo and P. Sydow. It is a volume of 1233 pages, in addition to which there is an index (printed on yellow paper) to the groups and genera contained in the whole work.

The last instalment (vol. iii. fasc. 1) of Prof. Urban's *Symbolæ Antillanæ* is devoted to "Notæ biographicæ peregrinatorum Indiæ occidentalis botanicorum." Much of the interesting biographical information, supplied by botanists still living, will be invaluable to the future historian of botany.

The fifth volume (the first in appearance) of the *Recueil de l'Institut Botanique* of the Brussels University has just been published. The main object of the work seems to be the bringing together of papers by members of the University which were originally published elsewhere, and will now be accessible in a collected form. It is edited by Prof. Errera, and contains the

following papers: "Nature et signification des alcaloïdes végétaux," by G. Clautriau, who also contributes an essay on "La digestion dans les urnes de *Nepenthes*"; "Sur les alcaloïdes et les glycosides dans les Rénonculacées," by E. Vanderlinden; "Le lancement des trichocystes chez *Paramœcium Aurelia*" and "Sur le protoplasme des Schizophytes," by J. Massart; "Influence de la température sur la perméabilité du protoplasme," by F. Van Rysselberghe; "Sur le myriotomie comme unité dans les mesures osmotiques," and on *Spirillum Colossus*, by L. Errera; and some others. A provisional summary of the contents of vols. i.–iv. accompanies the volume.

In connection with the jubilee of the Owens College, Manchester, last month, the following botanists received the degree of D. Sc.:—Prof. Chodat, Prof. Howes, and Prof. Marshall Ward. The degree of M. Sc. was conferred upon Mr. Charles Bailey.

Mr. D. McAlpine, the Government Vegetable Pathologist for Victoria, has recently published a pamphlet for the benefit of market-gardeners, dealing with the fungi that most commonly attack cabbages and cauliflowers. The diseases are described and illustrated by some good coloured drawings and by microphotographs, and remedies are suggested in each case for the modification or extermination of the pest. "Black leg," caused by *Phoma Brassicæ*, is the most destructive fungus they have to contend with. It was first met with in 1897, and has already caused very serious loss to the growers. Cauliflowers suffer more severely than cabbages from this disease. *Plasmodiophora Brassicæ*, popularly called club-root, and well known in Europe, has also invaded the Colonies, and in some seasons has been very prevalent. *Cystopus candidus*, causing "white rust," attacks the leaves of seedlings, and does much damage to the plants. Dark spots on the leaves are due to *Sphærella Brassicæ*. This fungus fortunately attacks only the older leaves, and is thus of less harmful importance, though its presence is very undesirable. *Peronospora parasitica* forms a white bloom on the leaves and inflorescence. The mycelium invades the tissue of the host, and causes rotting of the parts affected. It has been termed "Black rot" by the Victorian market-gardeners.—A. L. S.

We clip the following from the *Daily News* of March 21: "Mr. George Claridge Druce, Hon. M.A., Deputy-Mayor of Oxford, has been admitted a member of Magdalen College on matriculation. A few years ago the University conferred on Mr. Druce the hon. degree of Master of Arts in recognition of his services to the study of botany; he was President of the British Pharmaceutical Conference at its meeting in Dublin last year; he is Curator of the Fielding Herbarium, and author of the Flora of Oxfordshire, Berkshire, and Northamptonshire. This is believed to be the first occasion an Oxford tradesman in business (Mr. Druce is a chemist in High Street) has been admitted a member of a College."

Mr. E. C. Horrell has been appointed Staff Biologist to the Essex County Council: his address is now—Elmhurst, New London Road, Chelmsford, Essex.

Mr. W. H. Pearson asks us to state that his address is now Park Crescent, Victoria Park, Manchester.

Gen. 34. Protococcus Rab.

P. marinus Kütz. Coast of Dorset (Weymouth, Swanage). Rare.

Fam. Palmellaceæ Näg.

Gen. 35. Glœocystis Näg.

G. adnata Näg. Coasts of Kent (Dover), Devon (Ilfracombe and Sidmouth), and Northumberland (Berwick). Rare.

Fam. Halosphæreæ Schm.

Gen. 36. Halosphæra Schm.

H. viridis Schm. Coast of Devon (Plymouth). Probably not uncommon.

Fam. Characiaceæ Wittr.

Gen. 37. Sykidion Wright.

S. Dyeri Wright. Coast of Ireland (Howth, near Dublin); Wales (Point of Ayr). Rare.

Gen. 38. Characium A. Br.

C. marinum Kjellm. (= *C. strictum* Holm. & Batt., non A. Br.). Coast of Northumberland (Berwick); S.W. Scotland (Cumbrae). Probably not uncommon.

Gen. 39. Codiolum A. Br.

C. gregarium A. Br. Coast of Devon (Axmouth). Rare.

C. pusillum Foslie (= *C. gregarium* Holm. Fasc. no. 60, non A. Br.; and *C. longipes* Holm. Fasc. no. 38, non Foslie). Coasts of Devon (Teignmouth and Lynmouth) and Northumberland (Spittal, near Berwick); Orkney Islands (N. Ronaldshay). Rare.

C. Petrocelidis Kuck. Coast of Northumberland (Berwick); Firth of Clyde, &c. Not uncommon.

Alga incertæ sedis.

Gen. 40. Prasinocladus Kuck.

P. lubricus Kuck. Coast of Devon (Plymouth).

Suborder Confervoideæ Ag.

Fam. Blastosporeæ Jessen.

Gen. 41. Prasiola Ag.

P. stipitata Suhr (= *P. marina* Crn. in Holm. Fasc. no. 21). Coasts of Northumberland (Berwick), Norfolk (Yarmouth), and Devon (Torquay, Teignmouth); S. Scotland (Dunoon, Cumbrae, Joppa near Edinburgh, Dunbar); Ireland. Not uncommon.

Gen. 42. Gayella Rosenv.

G. polyrhiza Rosenv. (= *Schizogonium disciferum* Holm. & Batt.). Coast of Northumberland (Berwick). Rare.

Fam. Ulvaceæ Rke.

Gen. 43. Pringsheimia Rke.

P. scutata Rke. Coasts of Northumberland (Berwick), Kent (Margate), and Dorset (Swanage); S.W. Scotland (Cumbrae, Ardrossan); Ireland (Belfast Lough). Rare.

Gen. 44. Protoderma Kütz.

P. marinum Rke. S.W. Scotland (Cumbrae). Rare.

Gen. 45. Ulvella Crn.

U. lens Crn. Coast of Devon (dredged in Plymouth Sound). Rare.

U. fucicola Rosenv. (= *U. lens* Batt. pro parte, non Crn.). Coasts of Northumberland (Berwick) and Cheshire (Heswall). Not uncommon. — *β globosa* Batt. Coast of Northumberland (Berwick). Rare.

U. confluens Rosenv. Coast of Dorset (Weymouth). Probably not uncommon.

Gen. 46. Monostroma Thur.

α Eumonostroma.

M. Wittrockii Born. Coast of Devonshire (Fowey River, Saltash, Plymouth); S. Scotland (Tayport). Rare.

M. latissimum Wittr. Coasts of Devon (Otterton) and Dorset (Portland). Rare.

M. laceratum Thur. Coasts of Cornwall (Lostwithiel, near Wadebridge), Dorset (Portland), and Essex (Maldon). Rare.

M. quaternarium Desmaz. Pl. Crypt. Franc. (nouv. sér.), no. 603. Coasts of Dorset (Poole Harbour, April, 1889; Weymouth, April, 1890) and Sussex (Pagham, April, 1892; E. M. Holmes).

M. orbiculatum Thur. "Sur quelques algues nouvelles" in Mém. Soc. Nat. Cherb. vol. ii. p. 388. Coasts of Cornwall (Falmouth, June, 1884; F. W. Smith) and Dorset (Weymouth, April, 1882; E. A. B.).

M. undulatum Wittr. Monostr. p. 46, tab. iii. fig. 9. Orkney Islands (Ronsay; Mrs. Traill, about 1837, in herb. J. H. Pollexfen).

M. crepidinum Farlow, Mar. Alg. New Engl. p. 42. Coasts of Cornwall (Falmouth, April, 1882, R. V. Tellam; and May, 1897, E. George) and Sussex (Pagham, April, 1892; E. M. Holmes). Rare.

β Ulvaria Rupr.

M. fuscum Wittr. emend. Rosenv. *α genuina* Batt. Coasts of Northumberland (Berwick) and Yorkshire (Scarborough); Scotland (Cumbrae, Orkney Islands, Skaill). Not uncommon. — *β Blyttii* Batt. (= *M. Blytii* Wittr.). Coasts of Northumberland (Berwick) and Kent (Dover); Scotland (Tayport, Cumbrae). Not uncommon.

M. Grevillei Wittr. emend. Rosenv. *α typica* Rosenv. (= *Ulva lactuca* Grev.). Coasts of Devon (Plymouth, &c.), Cornwall (Falmouth), Dorset (Weymouth), Hants (Isle of Wight), and Northumberland (Holy Island, Berwick); S. Scotland (Bute, Firth of

Forth); Ireland (Roundstone). Not common.— *β Vahlii* Rosenv. Grönl. Havalg. p. 949. Coast of Northumberland (Alnmouth, April, 1886, A. Amory; Holy Island, February, 1887, E. A. B.). Rare. — *γ arctica* Rosenv. *l. c.* Coast of Scotland (Cromarty, July, 1896, E. M. Holmes). Rare. — *δ lactuca* Hauck (= *M. lactuca* J. Ag.). South coast of England (Weymouth, Torquay, &c.). Rare. — *ε Cornucopiæ* Batt. (= *Enteromorpha Cornucopiæ* Carm.). Coasts of Devon (Torquay) and Northumberland (Berwick); Scotland (Appin, Orkney Islands). Rare.

Gen. 47. Capsosiphon Gobi.

C. aureolus Gobi. South Coast of Scotland (Tayport, Cumbrae). Rare.

Gen. 48. Percursaria Bory.

P. percursa Rosenv. (= *Enteromorpha percursa* Ag.). Coast of Sussex (Pevensey Marsh); Wales (Bangor, Point of Ayr); S. Scotland (Bute, Ardrossan, Appin, Joppa, Elie (Fifeshire), Orkney Islands, &c.); Ireland (Larne).

Gen. 49. Enteromorpha Link.

E. clathrata J. Ag. *α genuina* Batt. Not uncommon on the coasts of England, Scotland, and the Channel Islands. Ireland?— *β Linkiana* Batt. (= *E. Linkiana* Grev.). Coasts of Cornwall (Trevone, Fowey, Looe) and Devon (Torquay, Sidmouth); Scotland (Appin, Cumbrae). Rare. — *γ gracilis* (Le Jol.). Coasts of the Channel Islands (Guernsey). Rare.—*δ procera* Hauck. Coast of Devon (Torquay). — *ε prostrata* (Le Jol.). Coasts of Cornwall (Falmouth, Looe), Devon (Torquay), Essex (Maldon, Wivenhoe), Norfolk (Yarmouth), and Northumberland (Berwick); Scotland (Orkney Islands).

E. paradoxa Kütz. *α typica* Batt. (= *E. erecta* Harv. Phyc. Br. xliii. and *E. pulcherrima* Holm. & Batt. Rev. List). Coasts of Devon (Torquay) and Sussex (Brighton). Rare. — *β tenuissima* (Kütz.) (= *E. Hopkirkii* McCalla). Coasts of Cornwall (Looe), Devon (Torquay), Sussex (Bognor), Dorset (Weymouth), and Northumberland (Berwick); Scotland (Orkney Islands); Ireland (Carrickfergus). Not uncommon. — *γ erecta* Batt. (= *E. erecta* Hook.). Coasts of Cornwall (Falmouth, Fowey, Whitsand Bay), Devon (Torquay), Hants (Isle of Wight), and Northumberland (Berwick); Scotland (Bute, Cumbrae, Ardrossan, Appin, Firth of Forth, Orkney Islands); Ireland (Roundstone, Bantry, &c.). Not uncommon.

E. Ralfsii Harv. Coasts of Dorset (Studland and Weymouth), Devon (Sidmouth), and Northumberland (Holy Island); N. Wales (Bangor). Rare.

E. torta Reinb. (= *E. percursa* Harv. non alior.). Coasts of Cornwall (Wadebridge), Devon (Tor Abbey), Essex (Clacton), and Northumberland (Berwick); N. Wales (Point of Ayr); Scotland (Arran, Bute, Appin, &c.); Ireland (Clontarf, Larne, &c.); Channel Islands (Guernsey). Not uncommon.

E. marginata J. Ag. (= *E. canaliculata* Batt.). Coasts of Kent (Dover), Essex (Leigh, Clacton), and Northumberland (Berwick); Scotland (Bute, Cumbrae). Not uncommon.

E. prolifera J. Ag. (= *E. compressa β prolifera* Grev.). Coasts of Devon (Torquay), and Northumberland (Berwick); Scotland (Joppa, near Edinburgh). Not common. — *β tubulosa* Reinb. Devon (Torquay); Essex (Estuary of the Orwell).

E. crinita J. Ag. Coasts of Devon (Torquay) and Northumberland (Berwick); Scotland (Joppa, near Edinburgh). Rare.

E. lingulata J. Ag. Coast of Devon (Torquay); Scotland (Orkney Islands). Rare.

E. ramulosa Hook. *α robusta* Hauck. Coasts of Devon (Plymouth, &c.), Cornwall (St. Martin's, Scilly), and Northumberland (Berwick, Budle Bay, Holy Island); Ireland (Bantry); Channel Islands (Guernsey). Not uncommon.—*β tenuis* Hauck. Coast of Cornwall (Scilly Islands).

E. compressa Grev. Common on all the coasts of the British Islands. — *α constricta* J. Ag. South coast of England, not uncommon. — *β complanata* J. Ag. Coasts of Devon (Torquay, Sidmouth, &c.), Cornwall (Scilly Islands), and Northumberland (Alnmouth); Scotland (Orkney Islands).—*γ nana* J. Ag. Common everywhere.

E. Linza J. Ag. *α lanceolata* (Kütz.). Not uncommon on the coasts of the British Isles. — *β angusta* Kütz. S.W. coast of Scotland (Cumbrae). Rare.

E. intestinalis Link. Very common everywhere on the coasts of Britain and Ireland. — *α ventricosa* (Le Jol.). South coast of England (Torquay, Bembridge, Isle of Wight); Orkney Islands; Channel Islands (Guernsey, Alderney). Not uncommon. — *β flagelliformis* (Le Jol.). Orkney Islands (Pulroit, Kirkwall); south coast of England.—*γ bullosa* (Le Jol.). South coast of England; Orkney Islands. Not uncommon. — *δ Cornucopiæ* Kütz. (non *E. Cornucopiæ* Carm.). Not uncommon on the coasts of the north of England and Scotland. —*ε maxima* J. Ag. South coast of England (Weymouth, Poole, &c.) and Northumberland (Berwick). Probably common.

E. micrococca Kütz. *β tortuosa* J. Ag. Coasts of Kent (Sandgate) and Essex (Clacton); Scotland (Arran, Cumbrae, &c.). Rare.

E. minima Näg. Coasts of Norfolk (Yarmouth), Essex (Clacton), Devon (Sidmouth), and Northumberland (Berwick). Not uncommon.

E. usneoides J. Ag. Alg. Syst. iii. p. 157. South coast of England (W. Cowes, Isle of Wight; E. Poutiatine, St. Martin's, Scilly Islands, June, 1899, E. George; Torquay, Miss E. H. Boning); S.W. Scotland (Cumbrae, August, 1891, E. A. B.).

Gen. 50. Ulva L.

U. lactuca L. *α rigida* Le Jol. (= *U. rigida* Ag.). South coast of England (Torquay, Plymouth, Weymouth); Channel Islands (Alderney). Rare. — *β latissima* DC. (= *U. latissima* J. Ag.). Everywhere common.—*γ myriotrema* Born. (= *U. myriotrema* Crn.). S. coast of England (Torquay, Weymouth), and Northumberland

(Berwick). Rare. — δ *nana* (Suhr). Coast of Northumberland (Berwick); Scotland (Arbroath). Probably common.

Fam. Ulothrichaceæ Rabenh.

Gen. 51. Ulothrix Kütz.

U. implexa Kütz. (= *Lyngbya Cutleriæ* Harv.). Coasts of Devon (Budleigh Salterton), Sussex (Lancing), Yorkshire (Scarborough), and Northumberland (Berwick); Wales (Point of Ayr); Scotland (Cumbrae). Rare.

U. flacca Thur. (= *Lyngbya flacca* and *L. Carmichælii* Harv.). Coasts of England, S. Scotland, and Ireland. Not uncommon.

U. speciosa Kütz. (= *Lyngbya speciosa* Carm.). Coasts of Devon (Torquay, Paignton), Cornwall (Mounts Bay), Dorset (Weymouth), Durham (North Sunderland), and Northumberland (Berwick); Scotland (Appin, Dunbar, Girdleness); Ireland (Ballycastle). Rare.

Fam. Chætophoraceæ Wittr.

Gen. 52. Phæophila Hauck.

P. dendroides Batt. (= *Ochlochæte dendroides* Crn. and *Phæophila Floridearum* Hauck). Coast of Dorset (Weymouth, Swanage). Rare.

P. Engleri Rke. Coast of Dorset (Weymouth). Rare.

Gen. 53. Ochlochæte Thw.

O. hystrix Thw. Coasts of Dorset (Littlesea, Studland) and Gloucester (near Bristol). Very rare.

O. ferox Huber. S.W. coast of Scotland (Cumbrae). Rare.

Gen. 54. Acrochæte Pringsh.

A. repens Pringsh. Coast of Dorset (Weymouth, Swanage); Scotland (Cumbrae). Rare.

A. parasitica Oltm. Coasts of Northumberland (Berwick) and Devon (Sidmouth). Probably common.

Gen. 55. Bolbocoleon Pringsh.

B. piliferum Pringsh. Coasts of Dorset (Chapman's Pool, Swanage, Weymouth) and S. Scotland (Cumbrae, Dunbar). S.E. Ireland (Dungarvan Bay). Probably common.

Gen. 56. Pilinia Kütz.

P. rimosa Kütz. Coasts of Dorset (Swanage), Norfolk (Yarmouth), and Northumberland (Berwick).

Gen. 57. Blastophysa.

B. rhizopus Rke. Coast of Norfolk (Yarmouth). S.W. Scotland (Cumbrae); Ireland (Torr Head, Antrim).

Gen. 58. Endoderma Lagerh. (incl. Epicladia Rke.).

E. viride Lagerh. Coast of Devon (Torquay, Teignmouth); S.W. Scotland (Cumbrae, Arran); S.E. Ireland (Dungarvan Bay). Not uncommon.

E. Wittrockii Wille. Coast of Northumberland (Berwick); N. Wales (Puffin Island, Hilbre Island); S.W. Scotland (Arran, Cumbrae). Probably common.

E. leptochæte Huber. Coast of Devon (Teignmouth). Rare.

E. Flustræ Batt. (= *Epicladia Flustræ* Rke.). Common on the coasts of England and S. Scotland; Ireland (Belfast Lough).—*β Phillipsii* Batt. N. Wales (Bangor). Rare.

Gen. 59. Tellamia Batt.

T. contorta Batt. Coasts of Cornwall (Padstow), Devon (Plymouth, Sidmouth, &c.), Dorset (Swanage, Weymouth), and Northumberland (Berwick); S.W. Scotland (Cumbrae); Ireland (Galway Bay). Common.

T. intricata Batt. Coast of Dorset (Weymouth, Swanage); S.W. Scotland (Cumbrae); Ireland (Galway Bay). Not uncommon.

Fam. Cladophoraceæ Wittr.

Gen. 60. Urospora Aresch.

U. isogona Batt. (= *Conferva isogona* Eng. Bot. tab. 1930; *Conferva Youngana* Dillw.; and *Urospora penicilliformis* Aresch. ex parte). Coasts of Cornwall (Par), Devon (Torquay), Norfolk (Yarmouth), Essex (Clacton), and Northumberland (Berwick); Wales (near Dunraven Castle, Glamorganshire); Scotland (Joppa, near Edinburgh; Dunbar; Elie, Fifeshire; Arbroath, Montrose, Cumbrae, Oban, &c.). Not uncommon.

U. bangioides Holm. & Batt. (*Conferva bangioides*). Coasts of Devon (Torquay, Plymouth); N. Wales (Puffin Island); Scotland (Oban, Argyleshire; Port Ballantrae, Bay of Nigg, near Aberdeen; Montrose Ness); Ireland (Ballycotton).

U. collabens Holm. & Batt. (= *Conferva collabens* Ag.). Coast of Norfolk (Yarmouth); S.W. Scotland (Cumbrae). Very rare.

Gen. 61. Chætomorpha Kütz.

α Tortuosæ.

C. tortuosa Kütz. (= *Conferva tortuosa* Dillw. and *Chætomorpha implexa* Holm. & Batt. Rev. List). Coasts of Cornwall (Mounts Bay, Falmouth, Looe, Fowey, &c.), Devon (Ilfracombe, Plymouth, Torbay, &c.), Norfolk (Yarmouth), and Northumberland (Berwick); Wales (Swansea, Puffin Island, Anglesea); Isle of Man; Scotland (Castle Toward, Oban, Cumbrae, Saltcoats, Dunbar, Joppa, Firth of Forth, Largo and Elie, Fifeshire; Nigg Bay, Kincardine: Orkney Islands); Ireland (Roundstone, Bantry, Miltown Malbay, Skerries); Channel Islands (Jersey, Guernsey). Not uncommon.

C. litorea Cook (= *Conferva litorea* Harv., *C. chlorotica* Kütz., and *C. cannabina* Traill, Ork. Alg.). Coasts of Devon (Plymouth), Sussex (Lancing), and Essex (Walton); Wales (Bangor); Scotland (Appin, Arran, Cumbrae, Orkney Islands). Rare.

C. linum Kütz. (= *Conferva sutoria* Berk.). Coasts of Cornwall (Penzance), Dorset (Weymouth), Hants (Isle of Wight), Sussex (Lancing), Essex (Southend), Norfolk (Yarmouth), Durham (Hartlepool), and Northumberland (Holy Island, &c.); Wales (Anglesea,

Puffin Island); Scotland (Cumbrae, Oban, Joppa, Orkney Islands). Not uncommon.—*β pulvinata* Batt. Scotland (Cumbrae). Rare.

C. crassa Kütz. (= *Conferva linum* Harv. non alior.). Ireland (Ditches by the North Wall, Dublin); Channel Islands (Guernsey). Rare.

β Strictæ.

C. ærea Kütz. (= *Conferva ærea* Dillw. and *Chætomorpha baltica* Kütz.). Coasts of Cornwall (Mount's Bay, Land's End, Falmouth, Padstow, Looe, &c.), Devon (Ilfracombe, Torbay, Sidmouth, &c.), Dorset (Durleston Head), Hants (Isle of Wight), Sussex (Bognor), Suffolk (Felixstowe), Norfolk (Cromer), Yorkshire (Scarborough), and Northumberland (Alnmouth, Berwick); Scotland (Dunbar, Orkney Islands, Arran, Cumbrae, &c.); Wales (Laugharne Harb., Carmarthen, Anglesea, Puffin Island); Ireland (Roundstone, Kilkee, &c.); Channel Islands (Jersey, Guernsey, &c.). Not uncommon.

C. Melagonium Kütz. (= *Conferva Melagonium* Web. & Mohr. *β rupincola* Aresch.). Coasts of Cornwall (St. Minver, Mount's Bay, Kynance Cove, &c.), Devon (Torquay, Sidmouth, &c.), Dorset Swanage, Weymouth, &c.), Hants (Isle of Wight), Sussex (Bognor), Suffolk (Felixstowe), Norfolk (Runton), Yorkshire (Scarborough), and Northumberland Berwick); Wales (Puffin Island, &c.); Isle of Man; Scotland (Dunbar, Firth of Forth; Joppa, near Edinburgh; Elie, Fifeshire; Arbroath, Orkney and Shetland Islands, Cumbrae, Arran, Sound of Kerrara, &c.); Channel Islands (Jersey). Widely distributed, but nowhere in great abundance.

Gen. 62. Rhizoclonium Kütz.

R. Kochianum Kütz. (incl. *R. implexum* Kütz.). Coasts of Devon (Plymouth) and Northumberland (Berwick); Scotland (Elie, Fifeshire; Cumbrae); Ireland (Roundstone). Rare.

R. implexum nob. non Kütz. (= *Conferva implexa* Dillw., *R. tortuosum* Kütz., and *R. rigidum* Gobi). Coasts of Cornwall (Mount Edgecumbe, Mount's Bay), Devon (Ilfracombe, Torbay, Sidmouth), Dorset (Weymouth), Essex (Clacton), Durham (Seaham Harbour), and Northumberland (Tynemouth, Bamburgh, Berwick); Scotland (Firth of Forth, Dunbar, Girdleness, Saltcoats, Arran, Cumbrae, Orkney Islands); Ireland (Malbay); Channel Islands (Guernsey). Not uncommon.

R. arenicola Reinb. (= *Conferva arenicola* Berk.). Coasts of Cornwall (Marazion) and Dorset (Poole). Rare.

R. arenosum Kütz. (= *Conferva arenosa* Carm. and *R. flavicans* Rab.). Coasts of Cornwall (Talland Bay) and Devon (Tor Abbey); Scotland (Appin, Cumbrae, Wemyss Bay, Elie, Fifeshire; Orkney Islands) :Ireland (Bantry Bay). Rare.

R. riparium Harv. Coasts of Cornwall (Trevone, Fowey, St. Minver), Devon (Torquay, Sidmouth), Dorset (Weymouth, Swanage), Sussex (Bognor), Kent (Deal), Essex (Harwich), Norfolk (Yarmouth), and Northumberland (Sunderland, Tynemouth, Berwick, Holy Island); Wales (Puffin Island, Hilbre Island); Isle of Man; Ireland (Bantry, &c.); Channel Islands (Jersey). Common.—

β Casparyi Holm. & Batt. (= *R. Casparyi* Harv.). Coast of Cornwall (Falmouth, Penzance, Mousehole, St. Minver). Rare.

Gen. 63. Cladophora Kütz.

Subgenus 1. Eucladophora Farlow.

C. prolifera Kütz. Coast of Dorset (Weymouth). Rare.

C. pellucida Kütz. Coasts of Cornwall (Mount's Bay, Falmouth, Looe, Fowey, &c.), Devon (Torquay, Plymouth, Salcombe), Dorset (Weymouth), Hants (Isle of Wight), Sussex (Bognor), and Norfolk (Yarmouth); Wales (Anglesea, Puffin Island); Isle of Man; Scotland (Cumbrae, Orkney Islands); Ireland (Belfast Lough, Roundstone, Malbay, &c.); Channel Islands (Guernsey, Jersey). Not uncommon on the shores of England and Ireland; very rare in Scotland.—*α comosa* Kütz. Coast of Wales (Puffin Island).—*β cristata* Kütz. Coast of Ireland (Roundstone); S. England (Bognor).—*γ curvata* Kütz. Isle of Man.

C. Hutchinsiæ Harv. Coasts of Cornwall (Fowey, Falmouth, Scilly Islands), Devon (Plymouth, Torquay, Salcombe, Sidmouth), Dorset (Swanage, Weymouth), Hants (Isle of Wight), Sussex (Brighton, Bognor), Essex (Harwich), Suffolk (Felixstowe), and Northumberland (Berwick, Holy Island); Wales (Anglesea, Hilbre Island); Isle of Man; Scotland (Burnmouth, Ardrossan, Cumbrae, Saltcoats, Orkney Islands); Ireland (Belfast Bay, Bantry, Larne). Not uncommon on the coasts of England and Ireland; rare in Scotland. — *α divaricata* Harv. Coasts of Devon (Torquay) and Isle of Man. — *β distans* Kütz. (= *C. diffusa* Harv.). Coasts of Cornwall (Looe, Scilly Islands, Falmouth), Devon (Torquay, Bovisand, Sidmouth), and Sussex (Brighton); Wales (Swansea); Scotland (Bute); Ireland (Portrush, Malbay, &c.); Channel Islands (Guernsey). Not uncommon.

C. falcata Harv. Coast of Devon (Plymouth); Ireland (Dingle Harbour, Kerry); Channel Islands (Jersey). Very rare.

C. Macallana Harv. Dredged in Roundstone Bay.

C. rectangularis Harv. Coasts of Cornwall (Whitsand Bay, Scilly Islands), Devon (Tor Abbey, Meadfoot), Dorset (Swanage), and Hants (Isle of Wight); Ireland (Roundstone Bay, Great Aran Island, Galway Bay). Very rare on the English coast, but locally abundant on that of the West of Ireland. — *α submuda* Kütz. Coast of Devon (Torquay).—*β horrida* Kütz. (= *Conferva Crouani* Chauv.). W. coast of Ireland (Roundstone Bay and S.W. Scotland (Arran). — *γ hispida* Kütz. Coasts of Devon (Torquay) and N. Ireland (Roundstone Bay).

C. Neesiorum Kütz. *β humilis* Batt. (= *C. humilis* Kütz.). Coasts of Devon (Sidmouth), Dorset (Swanage), Sussex (Bognor), and Northumberland (Berwick); Scotland (Cumbrae). Probably not uncommon.

C. rupestris Kütz. Coasts of Cornwall (Mount's Bay, Falmouth, Looe, Fowey, &c.), Devon (Plymouth, Whitsand Bay, Sidmouth, &c.), Somerset (Minehead), Dorset (Weymouth, Swanage, &c.), Hants (Isle of Wight, Christchurch), Sussex (Bognor, Worthing, Hastings), Kent (Deal, Ramsgate), Essex (Harwich, Clacton),

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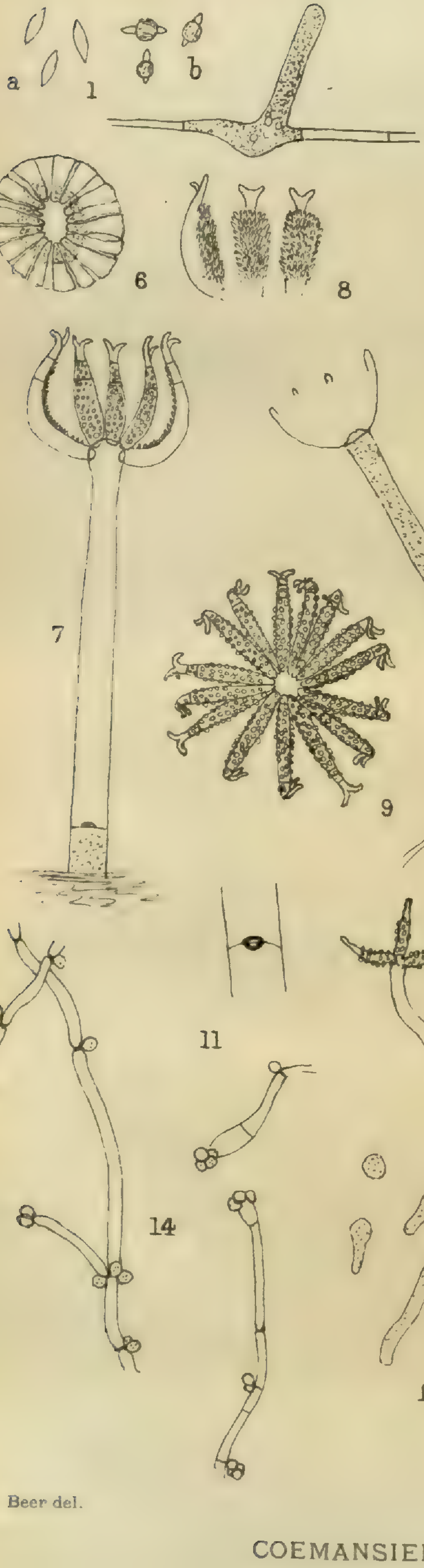

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COEMANSIELLA ALABASTRINA.

COEMANSIELLA ALABASTRINA.

By Rudolf Beer, F.L.S.

(Plate 437.)

The reappearance, in a different country, of an organism which has previously only been recorded on two occasions, the latest of which dates back nearly thirty years, seemed to be worthy of notice.

In 1862 Coemans discovered in Belgium a very beautiful little microscopic fungus, which was growing on some gutter slime which had been kept under observation. He gave a short description with some figures of this new form, which he named *Kickxella alabastrina* (Bull. de la Soc. R. de Bot. de Belgique, tom. i., Nov. 1862, p. 155).

For eleven years we heard no more about this fungus. In 1873, however, Van Tieghem and Le Monnier met with it again, in France, upon the dung of various animals—cat, horse, and especially rat. In their account of the French specimens, Van Tieghem and Le Monnier both amplified and corrected Coemans' description, and they figure several stages unknown to their predecessor ('Recherches sur les Mucorinées,' *Ann. des Sci. Nat.*, tome xvii., 1873, p. 385, and pl. 25, fig. 129–135).

Coemans had found the conidiophores of his fungus associated with an ascal fruit, and although he was unable to trace the connection between the two reproductive organs, he suggested the probability of such a connection really existing. Van Tieghem and Le Monnier likewise observed perithecia of various kinds associated with the conidiophores, but they also were unable to establish any actual connection between the two fruit-forms. Saccardo, in his *Sylloge Fungorum*, has reserved the name *Kickxella alabastrina* (Coem.) for the perithecium observed and figured by Coemans, and has named the conidial form, which may or may not be connected with it, *Coemansiella alabastrina*. Beyond a brief description by Lindau in Engler and Prantl's *Pflanzenfamilien* (1 Theil, 1 Abt., p. 429), I can find no further mention of this form in the literature.

In October of the present year a fine crop of *Coemansiella alabastrina* sprang up on some horse-dung which had been collected at Shortlands, in Kent, and afterwards kept in a covered dish for some days. I have succeeded in making numerous cultures of this fungus in hanging drops of sterilized gelatine horse-dung decoction, and although I have little to add to Van Tieghem and Le Monnier's account, my independent observations made upon the English specimens may still possess some interest for British mycologists.

Viewed under a low power of the microscope, as it grows on its natural substratum, we see a little forest of pure white conidiophores. Each conidiophore consists of a short pedicel surmounted by a circle of arms which spread out to a greater or less extent according to the age of the fungus. Each arm bears upon its upper surface a number of conidia. Frequently the end of the pedicel, lying at

the centre of the circle of arms, secretes a drop of water, which glistens and shines in the light.

If the conidia springing from the upper surface of the rays of the conidiophore be transferred to a hanging drop of gelatine horse-dung decoction, they will germinate in the curious manner which Van Tieghem and Le Monnier described. The conidium at its formation is of an elongated fusiform shape with acutely pointed ends (fig. 1a). At the commencement of germination its middle region swells up, and it is from this inflated zone that two slender hyphæ grow out in opposite directions (fig. 1b). From these hyphæ the branched, septate mycelium rapidly develops, and at certain spots upon this mycelium the initials of the conidiophores soon make their appearance. Van Tieghem and Le Monnier state that the ends of the hyphæ swell up to form fusiform bodies, which give origin to the conidiophores. In my cultures it appeared to me that intercalary cells of the hyphæ, quite as often as terminal ones, swelled up sometimes into fusiform bodies, sometimes into more or less irregular shapes, and that these vesicles then grew up into sub-aerial prominences, from which the conidiophores developed.

The prominence, which springs from the swollen cell of the hypha, may be simple, as is usually the case, or it may branch into two very early in its development (figs. 2 & 3); each of the branches then develops into a distinct conidiophore. At first these conidiophore-initials are continuous with the cell from which they spring, but before they proceed far with their growth they are cut off by a cross wall. At this stage they form relatively broad, straight, or gently curved cylindrical bodies, which are quite plane throughout their length. The next step in their progress is marked by their free extremities becoming slightly swollen into not very conspicuous terminal knobs. A little later, just below the swollen extremity, a circle of tiny protuberances or papillæ becomes visible upon each young conidiophore (figs. 4 & 5). As the stalk elongates these papillæ increase in length, and form a ring of arms radiating from the end of the stalk. The growth of these rays is, at first, more rapid upon their lower sides, so that they become curved inwards, and their converging tips cover over the end of the pedicel which bears them, leaving only a small central area exposed (fig. 6). At first the converging tips of the rays are simple and unbranched, and in a well-developed specimen they fit closely together side by side. At this stage the apices are filled with finely granular protoplasm (fig. 6).

As the plant grows older the arms gradually bend back and expose the end of the pedicel and their own upper surfaces. Moreover, in most cases, their apices now become forked and quite hyaline. It is worth noting that, whilst plants growing on their natural substratum usually had arms with a terminal bifurcation, those developed in hanging-drops more commonly maintained simple ends to their rays.

In their earlier stages the rays are unseptate, but later two walls make their appearance in each. These walls are not equally dis-

tributed along the arm (as Van Tieghem and Le Monnier state them to be), but both lie in the distal half (figs. 7 & 17). Van Tieghem and Le Monnier have represented rays with three septa (*l. c.* fig. 129), but in no case have I seen more or less than two in any of my specimens.

The upper surfaces of the proximal and middle segments of each ray become studded with minute, rounded eminences—the sterigmata—each of which bears a conidium. The distal segment of the ray always remains smooth and free from spores (fig. 7).

The conidia are hyaline, elongated-fusiform bodies with acutely pointed ends. They measure ·01 mm. in length and ·003 mm. in breadth. They are arranged upon the sterigmata in a very regular manner, with their long axes directed obliquely upwards in the manner represented in fig. 8.

In fully developed conidiophores the arms are widely spread out, like the rays of a star, and form very beautiful objects when looked down upon from above (fig. 9). The number of rays may vary widely; in my specimens I have counted all numbers between three and seventeen (cp. figs. 9 & 10). Van Tieghem and Le Monnier have recorded examples in which only one ray was formed, and they have observed various abnormalities in which the ray was reversed, so that the conidia were directed downwards, or in which it formed the direct continuation of the pedicel, and bore the conidia laterally. The length of the ray is about ·06 mm., but it varies considerably in different individuals; the average diameter of the circle of expanded rays in several typical specimens was ·13 mm.

In the portion of the pedicel which rises above the substratum I have regularly observed only a single septum, but both Coemans and Van Tieghem and Le Monnier have described the presence of three or four cross-walls. The single septum of my specimens lay low down in the pedicel only a short distance above the substratum (fig. 7); it is pitted at its centre, and this pit is closed by a little knob or disc of substance of undetermined nature lying either on one or both sides of the septum (figs. 7 & 11). In the majority of cases the conidiophores are unbranched, but in a few examples I have seen two conidiophores borne upon a common stalk (fig. 12).

The measurements of the pedicel of a typical specimen were:—

Length of entire pedicel . . . . . ·4 mm.
(the septum was ·17 mm. above substratum).
Breadth of pedicel—
(*a*) at base . . . . . ·02 mm.
(*b*) just below terminal knob . . . ·01 mm.
(*c*) at terminal knob . . . . . ·03 mm.

Besides the formation of these characteristic conidiophores, Van Tieghem and Le Monnier described the development of chlamydospores by these plants. In one of my hanging-drop cultures numerous chlamydospores appeared upon the hyphæ, which penetrated the gelatine in every direction. I was never able to satisfy myself as to the continuity between the hyphæ, which bore the conidiophores and those beset with chlamydospores,

but the close association and sequence of the two structures were at least suggestive of such a continuity. With this reservation, I have figured the chlamydospores of this culture (fig. 13).

A third form of reproductive body was observed in a large number of cultures. Under certain conditions small, thin-walled conidia of a spherical shape were formed at the septa of the mycelial hyphæ. Two to four conidia was the number usually formed at a septum (figs. 14 & 16). These very delicate spores often contain large, highly refractive globules, probably of an oily nature. The hyphæ bearing the conidia in many cases break up into segments of greater or less length, and in these cases the conidia at the free septum shift to the end, and the whole curiously resembles a basidium bearing basidiospores (fig. 14). Only the early stages of the germination of these hyphal conidia was observed (fig. 15).

Unfortunately, the conditions which favour the development of hyphal conidia appear to inhibit the development of the characteristic conidiophores. Consequently, the one direct and conclusive proof of the actual connection between the hyphæ bearing conidia and the conidiophore is wanting. The precautions which I used in setting up the cultures and the close similarity of the hyphæ in the two cases leave little doubt in my mind that the two conidial forms belong to the same fungus; but, until we can actually trace this connection, we cannot be quite certain that we are not confusing two organisms in one life history.

Like those who have described *Coemansiella* before me, I have not succeeded in establishing its connection with a higher fruit-form.

In conclusion, I will return for a moment to the conidiophores, and briefly refer to the statement made by Coemans that "certain pedicels are surmounted by a small sporangial vesicle which is placed between the rays, and which forms a prolongation of the axis of the stalk." The drop of water which, as I have already mentioned, is secreted by the end of the pedicel closely simulates such a terminal sporangium; moreover, when the conidia are ripe, I have frequently seen them simultaneously floated up, as it were, in this drop of water, and set free as a round ball of spores still held together by the moisture. Such balls of conidia might easily be mistaken for sporangia which were formed at the end of the pedicel, and cast off with its spores still enclosed within it.

EXPLANATION OF PLATE 437.

Coemansiella alabastrina. — Fig. 1. Conidia; (*a*) resting, (*b*) germinating. 2–6. Development of conidiophore. 7, 17, 18. Mature conidiophore; lateral view. 8. Arrangement of conidia on conidiophore. 9. Rays of mature conidiophore viewed from above; spores have been liberated; note sterigmata. 10. Conidiophore with only three rays. 11. Pitted septum in pedicel of conidiophore. 12. Branched conidiophore. 13. Chlamydospores. 14. Hyphal conidia. 15. Germination of hyphal conidia. 16. Hyphal conidia more highly magnified than in fig. 14.

THE BRITISH CAPREOLATE FUMITORIES.

By H. W. Pugsley, B.A.

(Concluded from p. 136.)

The next name in the *London Catalogue*, F. CONFUSA Jordan, is one which probably would never have presented any difficulty if the confusion respecting *F. Boræi* had not arisen. As many botanists have met with the plant which Babington and Syme described as *F. Boræi* Jord., and have followed them in so naming it, they have naturally been at a loss to know where to place the true plant of Jordan, and in many instances have referred it to *F. confusa*. In the Herb. Mus. Brit. is a specimen of this kind collected in Fifeshire in 1874 by Dr. Boswell-Syme himself, and so labelled; while in the Herb. Boswell the parcel of *F. confusa* consists almost entirely of similar plants, a sheet of the true species being doubtfully included with a query against the name.

In view of this, and as in our British Floras the descriptions of *F. confusa* are very unsatisfactory, I will endeavour to point out some of the features which differentiate it from all the other British plants of the genus.

F. confusa was first described by Jordan in the *Catalogue Dijon*, 1848, a work which unfortunately I have not been able to consult. I have therefore been obliged to rely on the characters which the author assigns to it when contrasting it with other kindred Fumitories that he has described in other works; also on the specimens of Billot and others in the Herb. Mus. Brit., and on the account given in Boreau's *Flore du Centre*, where it is designated *F. Bastardi* Bor.

The chief character of *F. confusa*, which is emphasized by most of the French authors, lies in the form of its fruit, which is not narrowed below, as in almost all of its allies, and when fresh is actually broader at the base than the tip of the pedicel. It is also less obtuse than in the plants previously dealt with, and in a dry state appears appreciably more rugose, with a broad shallow pit on each side of the bluntish apex, which further distinguishes it. In the *Pugillus*, Jordan says of it: "Fructu minimè retuso . . . fructûs stipite . . . pedicelli crassitiem in vivo conspicuè superante." And Boreau, in his *Flore du Centre de la France*, writes: "fruit . . . à base très élargie, égalant son diamètre, et plus large que le sommet du pédicelle peu épaissi."

The racemes of *F. confusa* are generally furnished with shorter peduncles than those of the other "Capreolatæ," but they often bear a greater number of flowers; and the pedicels, which are invariably straight, are at least twice as long as the bracts. The sepals are smaller than in *F. Boræi* Jord., being always distinctly less than one-third of the length of the corolla (without its spur). They are also less toothed towards the base, narrower in outline—oblong or oval rather than subrotund-ovate—and are hardly produced below the point of insertion. Of these characters Boreau

writes: "Pédicelles droits, . . . dépassant deux fois les bractées; sépales ovales, . . . moitié plus petits que dans le *F. Boræi*, à peu prolongés au-dessous de leur insertion." It may be remarked that in the Capreolate Fumitories found in Britain the length of the sepals appears to vary proportionately with that of the bracts.

A further mark of distinction which, though apparently noticed by Haussknecht, does not seem to have hitherto been definitely pointed out, is that the two inner petals only are clearly tipped with dark purple, the upper one, which is similarly tipped, or at least as to its wings, in *F. Boræi* and other allied forms being in *F. confusa* never more than flushed on the back with a slightly deeper tint of pink than that prevailing throughout the corolla. This character, which is practically constant in all the British and foreign specimens that I have examined, can easily be seen in fairly developed flowers, even when dried, and forms, I think, the readiest means of determining the plant when the fruit is wanting.

Another noticeable point in this species is that in good flowers the reflexed wings of the upper petal are broader and more continuous round its edge than in any of the other British "Capreolatæ." In this they seem to approach the form of the more southern species, *F. agraria* Lagasca; and taking into consideration at the same time the coloration of the corolla and the characters of the fruit, I am disposed to regard *F. confusa* as a species almost equidistant between *F. Boræi* and *F. agraria*. By Rouy & Foucaud *F. confusa* is made the last of six forms of a collective species, *F. muralis* Sond. (which includes *F. Boræi*), and immediately precedes *F. agraria*, though specifically separated from it. In Britain, where the forms between *F. Boræi* and *F. confusa* have not been recorded, the two plants look so widely different that I certainly can only consider them as distinct species, although it is just possible, in such a variable genus as *Fumaria*, that *F. affinis*, *F. vagans*, and *F. Gussonii* may present a series of gradations that would connect the two. A more correct view, however, seems to be that of Haussknecht, who considered *F. confusa* to be a variety of *F. Gussonii* Boiss., and specifically distinct from *F. Boræi*. The type of *F. Gussonii*, which is unknown in Britain, was thought by Jordan (*Pugillus*, p. 5) to be intermediate between his *F. confusa* and *F. Boræi*, and nearer the latter. It is undoubtedly more closely related, as Haussknecht supposed, to *F. confusa*, which it resembles in the shape of the corolla and the rugosity of the fruit. The coloration of the flower and the shape of the fruit, however, are nearer to *F. Boræi*, and I should hesitate to specifically unite it with either of them. And, if united with *F. confusa*, I think that with us Jordan's name, which is ignored by Haussknecht as being used to describe a form only, would stand for the species, it being older by a year than that of Boissier.

F. confusa seems to be somewhat sparingly scattered over the greater part of Great Britain, but I know of only one habitat for it in Ireland. In the Channel Islands it is common. The British localities from which I have seen authentic specimens are—Penzance; the Lizard; Ilfracombe; Mudeford, Hants; Uckfield,

Sussex; Stourmouth, Kent; Tenby; Cardigan; Towyn; Anglesea; Holyhead; Isle of Man; Sale and Claughton, Cheshire; Middleton and Little Eccleston, Lancs.; Holy Island; Stranraer; Portpatrick, Wigton; near Glasgow; Kirkcaldy; and North Uist.

The remaining name in the *London Catalogue*, F. MURALIS Sonder, appears to be now used in this country to designate a variety of Fumitories of rampant habit, and bearing small, pale flowers of capreolate-like form. A number of the specimens that figure in herbaria under this appellation, mostly collected in the south-east of England, are clearly shown by their long racemes of retuse and rugose fruits to be allies or forms of *F. officinalis* L., in which the spathulate dilation of the tip of the lower petal is undeveloped. Neglecting these, therefore, I shall only consider such plants as undoubtedly belong to the capreolate section.

F. muralis was first published as a species in 1845, in the second edition of Koch's *Synopsis Floræ Germanicæ* (Appendix), the description being taken from a plant found by Sonder at Horn, near Hamburg; and as its distinguishing characters seem to have been mistaken, I shall quote the description *verbatim*, in spite of its having already been alluded to in connection with *F. Boræi*. It runs thus:—

"*Fructibus subrotundis-ovatis* obtusis *lævibus*, sepalis ovatis acuminatis corolla dimidia brevioribus dentatis, racemis evolutis laxis, pedicellis patentibus, foliorum laciniis oblongo-lanceolatis lanceolatisve. Habitum laxum decumbentem *F. capreolatæ* habet, sed flores amœne purpurei et fructus subrotundi quidem sunt, sed ob apicem obtusum, non vero truncatum, figuram subrotundo-ovatam exhibent. Pedicelli patentes sed non reflexi. Sepala evidenter minora."

This description is virtually repeated in Sonder's *Flora of Hamburg*, the author in his additional remarks noting that the fruit is "nicht so stark abgestutzt, sondern ein wenig eiförmig."

Reverting to Jordan's original diagnosis of his *F. Boræi*, it will be remembered that that plant was stated to be an ally of *F. muralis*, but separate from it on the ground of its larger flowers, its less blunt outer petals, and its large obovate-obtuse instead of small ovoid-acute fruits. Of these distinctions, the first can only be applied with very great discrimination, for *F. Boræi*, as Boreau and other French authors have been careful to remark, is extremely variable in the size of its flowers. With respect to the form of the outer petals, the sensible narrowing of the tip which should characterize *F. Boræi* is not evident unless the flowers are fully developed, and even then is, in my experience, variable and at times difficult to recognize in dried specimens. In *F. muralis*, which I regret is the one British form that I have not examined when fresh, the outer petals seem to be a little blunter, on the average, than those of *F. Boræi*; but I fail to find any radical difference in their outline such as clearly exists in the case of *F. confusa*. The remaining and most reliable means of segregation, therefore, would appear to lie in the fruit, which in the British Museum specimens of *F. muralis* from the "locus classicus" at Hamburg, is, as Koch and Jordan

say, very small and in form subrotund-ovate, *i. e.* broadest not above, but about, or a little below, the middle. In the immature examples the apex is distinctly acute; in the riper ones rather less so, but nevertheless far from the rounded or almost truncate form found in *F. Boræi.*

As a British species, the first trace of *F. muralis* is to be found, I believe, in Babington's paper of 1859, which has been so often quoted, where, after attention has been drawn to the smallness of the flowers and the pyriform profile of the fruits, the species is diagnosed as follows, *viz.*:—

"Sepalis ovatis acutis basi dentatis tubi corollæ latitudinem subæquantibus eodemque ⅔ brevioribus, *fructibus obovato-compressis* apice rotundatis parvis sublævibus, basi fructus lata obconica pedicelli apice paulo angustiore, bracteis pedicellos floriferos æquantibus fructiferis erecto-patentibus brevioribus, racemis evolutis laxis brevibus paucifloris."

It will at once be seen, on comparing the two diagnoses of *F. muralis*, that they are quite at variance respecting the form of the fruit, which has been shown to be the plant's most important specific character. Babington, who has been followed by other British authors, says it is obovate-compressed instead of subrotund-ovate, as in the original description; and in this respect, consequently, his plant would appear to resemble *F. Boræi*, rather than the species of Sonder with which it has been identified.

Although Boreau and other authors have mentioned the variableness of *F. Boræi*, no distinct varieties appear to have been established prior to the year 1882, when Clavaud, in his *Flore de la Gironde*, described three varietal forms, two of which seem to closely coincide with the plant described by Babington as *F. muralis.*

One of these two forms, *F. Boræi δ muraliformis*, is described by Clavaud in the following detailed terms:—"Forme notable . . . . grappe pauciflore, à axe ordinairement arqué-incurvé. Fleurs ordinairement pâles, parfois presque blanches, relativement petites. Pédicelles fructifères à direction indécise, généralement dressés ou dressés-étalés, fréquemment plus ou moins recurvés. Sépales . . . acuminés, égalant fréquemment la moitié de la corolle, surtout sur les jeunes fleurs. Fruit du *F. speciosa*, c'est-à-dire, globuleux, très arrondi au sommet et lisse, même sur le sec. Cette plante a tout à fait le port du *F. muralis* Sond., mais elle en diffère par son fruit globuleux, complètement arrondi au sommet et non 'ovoide subaigu ou obtusiuscule,' comme il est dit du *F. muralis.*"

The second of Clavaud's varieties, *γ serotina*, is less fully described, the author merely noting: "Forme tardive, à tige plus longue et plus grêle. Fleurs plus petites et plus pâles que dans le type, à sépales ordinairement plus petits."

Rouy & Foucaud do not mention these varieties, except that Clavaud's name, *δ muraliformis*, has rather strangely been adopted as a synonym of *F. muralis* Sond. (vera), from which the author so carefully distinguished it; the French collaborateurs taking the view that, in spite of the difference in the fruit, the two plants are identical and distinct from *F. Boræi* Jord. It has been shown that

this opinion is entirely opposed to that of Jordan and his contemporaries, who omitted *F. muralis* from the French flora; and after raising these plants from seed and more or less closely examining, both in the field and in the herbarium, a very large number of specimens, I can only think that such plants as Babington described as *F. muralis*, and Clavaud as γ *serotina* and δ *muraliformis*, are, as the latter supposed, distinct from the real plant of Sonder, and merely varieties or forms of *F. Boræi*, connected by a series of intermediates with the type, and owing their forms, in many cases, solely to the circumstances under which they happen to grow.

Although Clavaud's description of his variety γ *serotina* must certainly be regarded as meagre, yet, taking into conjunction with it the original account of *F. Boræi*, it will, I think, be seen that it offers no real contradiction to Babington's account of *F. muralis*. Almost the only difference is that, while the latter mentions the smallness of the fruit, the former is silent as to its size. And a cursory examination of the fruits of these slender forms suffices to show that they are frequently smaller and narrower than in the robuster plant which constitutes the type of *F. Boræi*, though at the same time distinctly larger than in the true *F. muralis* Sond.

In this connection it may further be observed that some English localities, which have long been recorded as habitats of *F. muralis* produce plants that answer equally well to Babington's description of *F. muralis* and Clavaud's account of *F. Boræi* var. *serotina*. Such Fumitories are usually mingled with or in the neighbourhood of other more robust plants, that are clearly not *F. muralis*, but forms of *F. Boræi*, more or less closely agreeing with the type; and I think that any careful observer will soon be convinced that the two forms pass into each other, and are only varieties or states of the one species, *F. Boræi*. An excellent figure of a Fumitory of this kind by J. W. Salter was published in the *Supplement to English Botany*, No. lxxxiii, June, 1866.

In some places, however, generally in light soils, where the type of *F. Boræi* is absent, another slender form occurs, which Clavaud's description of δ *muraliformis* fits with great exactness. This form, like the others, is variable, and the earliest flowers are sometimes fairly large; but the arched peduncles, large, acuminate sepals, and varying direction of the fruiting pedicels which are associated with the variety *muraliformis* characterize it so strongly that, although I have had no opportunity of seeing Clavaud's actual specimens, I think it may without hesitation be referred to that name.

The remaining variety of *F. Boræi* described by Clavaud as β *verna* is a short, stiff plant, appearing in the spring, with small, often vinous tinted foliage, and large, highly coloured flowers. I have not seen any examples of it collected in Britain, albeit it is quite likely to be found here; but some of the specimens collected in Guernsey in April, 1899, by Mr. Andrews, undoubtedly should be referred to it. It is the handsomest of all the forms of this species.

Besides these varieties of *F. Boræi*, there is one more form which should not escape without some mention, as it is abundant

in some districts, and has commonly been confounded with *F. confusa*. This plant possesses the stout habit of the type, with slightly smaller flowers, and is found in a short, branched form in exposed situations, becoming more or less rampant where sheltered. Its distinctive feature is its fruit, which is hardly narrowed below, and when fresh has a distinctly broad neck, simulating that of *F. confusa*. But it may be recognized by the surface never being truly rugose, when dry, and by the smallness of the apical pits; and in all other respects the plant resembles *F. Boræi*. As this is a well-marked variety in its extreme form, I am distinguishing it as var. AMBIGUA.

Having thus been led from the determination of *F. muralis* to discuss the most marked forms with which I am acquainted of *F. Boræi*, it now remains to consider the affinities of the two types, neither of which can be expunged from our flora, as plants differing from Babington's description of *F. muralis* and answering precisely to that of Koch and Jordan are found in at least one British locality. So far as I can judge, all of the forms that have been dealt with in this paper under the name of *F. Boræi*, while varying greatly in habit and in flower, are clearly separable from *F. muralis* by the fruit being always more or less obovate, with the apex distinctly rounded. In the few examples that I have seen of Sonder's plant there is a marked uniformity in the very small, subacute, subrotund-ovate fruits, which extends to the majority of the specimens of *F. muralis* collected by Lowe and others in Madeira and the adjacent islands, and now in the Herb. Mus. Brit. Considering, however, that no other difference of importance, as it seems to me, can be shown, and that an appreciable variation may be found in the form of the fruit among the various varieties of *F. Boræi*, I cannot think this character sufficient to warrant specific distinction, and am therefore inclined to regard the two as subspecies of one polymorphous plant. In this I regret my inability to follow the classification given in Haussknecht's monograph, where *F. Boræi* and *F. muralis* are treated as separate species. The author, in so doing, relies not only on the difference in the fruit, but also on that of the pedicels, concerning which he writes under *F. Boræi*: "Ferner durch die kurzen, dickeren, aufrecht-abstehenden Fruchtstielchen, die bei *F. muralis* dünner, länger und daher schlanker erscheinen, dabei unregelmässig abstehend, bald mehr oder weniger aufrecht, bald wagerecht, bald zurückgekrümmt." This contrast, of course, holds good in the case of the two types, but the monographer's remarks are almost identical with those of Clavaud concerning his variety, δ *muraliformis*, of *F. Boræi*, and the same features may certainly be found in some of the British forms with *Boræi*-like fruits. And as, moreover, among cultivated plants grown from the seed of stouter forms of *F. Boræi*, the same slender pedicels are prevalent, I cannot consider this means of distinction a very reliable one. The name of *F. muralis* Sond. being anterior to *F. Boræi* Jord., and, so far as I am aware, to all other names free from ambiguity which might be applied to these plants, I take it to represent the aggregate species.

As all the Capreolate Fumitories that I am acquainted with as British plants have now been dealt with to the best of my ability, I conclude this paper by appending a clavis of the forms, which I hope may be of some use to fellow-students. The exsiccata quoted are all to be found in the Herbarium of the British Museum.

In the accompanying plate, a fully-developed flower of each species and subspecies is shown, together with the characteristic profile of the fruits; the figures being in all cases drawn from British specimens in my own herbarium.

Fumaria L.

Sect. 1. *Capreolatæ* or *Latisectæ* of Haussknecht.

Leaf-segments never so narrow as linear. Flowers relatively large. Upper petal (in good flowers) with margins or wings which are persistently reflexed upwards. Lower petal little enlarged at the tip, with narrow and erect margins.

Subsect. 1. *Eu-capreolatæ*.

Bracts about as long as the fruiting pedicels. Sepals at least half as long as the corolla, excluding the spur. Upper petal narrowly winged. Pedicels rigidly recurved in fruit. Fruit truncate, and, when fresh, with a distinct neck, which is narrower than the dilated tip of the pedicel.

1. Fumaria capreolata L. Spec. 985; Hamm. Mon. p. 24; Gren. & Godr. Fl. Fr. i. p. 66; Fl. Dan. t. 2359.

Sepals half to two-thirds as long as the corolla, acute. Corolla creamy white, tipped with blackish red, sometimes tinted with pink or purple on the back. Pedicels much arched-recurved in fruit. Fruit smooth, as long or longer than broad.

Subsp. 1. *F. capreolata* L., sensu stricto; *F. capreolata* v. *parviflora* Haussk. in Flora, 1873; *F. pallidiflora* Jord. in Schultz, Arch. p. 305; Boreau, Fl. Centre de la Fr. ed. 3. Exsiccata: Heldr. Herb. Gr. Norm. no. 1003.

Sepals oval, two-thirds as long as the corolla. Corolla very persistent, sometimes coloured after fertilization. Fruit, when dry, rectangular in profile.

Subsp. 2. *F. speciosa* Jord. in Cat. Gr. 1849; Boreau, Fl. Centre de la Fr. ed. 3; *F. capreolata β speciosa* Hamm. Mon. Exsiccata: Billot, no. 708.

Bracts a little shorter than the fruiting pedicels. Sepals ovate-oblong, nearly entire, only half as long as the corolla. Corolla less persistent, usually coloured. Fruit smaller, and, when dry, more rounded in profile.

2. **Fumaria purpurea** mihi; *F. Boræi* Jord. apud Bab. in Trans. Linn. Soc. 1859, et Syme, Eng. Bot. ed. 3. Exsiccata: J. B. Syme, Dunearn Hill, Fife, 1871, in Herb. Mus. Brit. (under *F. Boræi*); F. Townsend, Gr. Malvern, 1881, Herb. Mus. Brit. (under *F. Boræi*); G. Brotherston, Galashiels, 1874, Herb. Mus. Brit. (under *F. pallidiflora*); W. Beckwith, Wroxeter, 1882, Herb. Mus. Brit. (under *F. Boræi*).

Flowers rather smaller than in *F. capreolata* L. Sepals about two-thirds as long as the corolla, oblong, often obtuse and nearly entire. Corolla purplish, tipped with dark purple. Upper petal with broader wings than in *F. capreolata* L. Pedicels patent-recurved in fruit. Fruit slightly rugulose when dry, broader than long.

Subsect. 2. *Murales*.

Late flowers often smaller and paler than those preceding them. Bracts distinctly shorter than the fruiting pedicels. Sepals usually less than half as long as the pink corolla (without its spur). Upper petal, in good flowers, with broader wings than in Subsect. 1. Pedicels usually straight and erect-spreading in fruit. Fruit rarely as truncate as in Subsect. 1, and, when fresh, with an inconspicuous neck, which is narrower or broader than the tip of the pedicel.

3. F. MURALIS Sond. (sensu lato) in litt. apud Koch, Synopsis, ed. 2, p. 1017; Fl. Dan. t. 2473.

Bracts more than half as long as the pedicels. Sepals ovate, nearly entire or much toothed (chiefly towards the base), one-third as long as the corolla or longer. Inner petals and also wings of upper petal tipped with dark purple. Upper petal acute or apiculate. Fruit smooth or rugulose, when dry, with small apical pits, its neck usually narrower than the tip of the pedicel.

Subsp. 1. *F. muralis* Sond. (sensu stricto); *F. media* Lois. v. *muralis*, in Hamm. Mon. Exsiccata: Billot, no. 2807; Mandon, Pl. Mader. no. 5.

Slender in habit, and with slender pedicels. Flowers small; upper petal apiculate. Fruit very small, smooth, subrotund-ovate in profile, subacute.

Subsp. 2. *F. Borœi* Jord. in Cat. Gr. 1849, et Pugillus, p. 4; Boreau, Fl. Centre de la Fr. ed. 3; *F. media* Lois. var. *typica*, in Hamm. Mon. Exsiccata: Billot, no. 2209 et bis; F. Schultz, Herb. Norm. no. 1007; Marshall, nos. 2413, 2414.

More robust in habit, and with thicker pedicels, except vars. δ and ε. Flowers larger; upper petal more acute; fruit larger, often rugulose, always more or less obovate, distinctly obtuse.

Var. β *verna* Clavaud. Short, stout, with small, often vinous tinted leaves. Flowers very large, deeply coloured.

Var. γ *ambigua* mihi. Flowers rather smaller than in the type. Sepals usually acuminate. Fruit, when fresh, with a broad neck, as in *F. confusa* Jord.

Var. δ *serotina* Cl. = *F. muralis* Sond. ap. auct. angl. (ex parte). Slender. Flowers smaller and paler than in the type, with smaller sepals.

Var. ε *muraliformis* Cl. = *F. muralis* Sond. ap. auct. angl. (ex parte). Slender. Peduncles incurved. Fruiting pedicels slender, variable in direction, usually straight, but sometimes recurved (without rigidity). Flowers more often small and pale. Sepals acuminate, sometimes half as long as the corolla.

4. F. CONFUSA Jord. in Cat. Dijon, 1848, et Pugillus, p. 5; *F. Bastardi* Bor. Fl. Centre de la Fr. ed. 2 & 3; *F. media* Lois.

var. *confusa*, in Hamm. Mon.; *F. Gussonii* Boiss. var. *diffusa* Haussk. in Flora, 1873. Exsiccata: Billot, no. 3307 et bis; F. Schultz, Herb. Norm. no. 605; Trimen, Tenby, 1867, Herb. Mus. Brit.; W. A. Shoolbred, N. Uist, 1898, Herb. Mus. Brit.

Bracts less than half as long as the pedicels. Sepals oval, toothed, less than one-third as long as the corolla. Inner petals only tipped with dark purple. Upper petal blunt, with broader and more continuous wings than in Species 3. Fruit rugose when dry, with broad and shallow apical pits; its neck as broad or broader than the tip of the pedicel.

EXPLANATION OF PLATE 436.

1. *Fumaria capreolata* L. 2. *F. speciosa* Jord. 3. *F. purpurea* mihi. 4. Flowers of *F. muralis* Sond. 5. *F. Boræi* Jord. 6. *F. confusa* Jord. All about three times natural size.

ANGLESEY AND CARNARVONSHIRE PLANTS.

BY G. CLARIDGE DRUCE, M.A., F.L.S.

WHEN an asterisk is placed before the name of a locality it signifies that the plant is not recorded for the county in Mr. Griffith's *Flora;* a dagger put before the name of a variety means that it is additional to the *Flora;* if before a locality, that it is new for the district. The records were obtained in visits to the counties in 1884, 1899, and 1900.

Thalictrum flavum L. †var. *riparium* Jord. In Nant Francon. Also in a garden near Bethesda, Carnarvonshire.

T. collinum Wallr. †var. *calcareum* (Jord.). Cliffs of the Great Orme's Head. Mr. Griffith records *T. dunense* for these cliffs, but I think the plant growing there should be referred to the above.

Ranunculus peltatus Schrank var. *truncatus* (Dumort.). Penrhos, 1884. Llyn Coron, Anglesey, Llyn an Afon, Carnarvonshire.

R. Baudotii Godr. †var. *fluitans* Gren. & Godr. Fl. Fr. i. 21. Rather common in a shallow pool near Conway, Carnarvonshire.

R. acris L. †var. *Stevenі* (Andrz.) appears to be the commoner form in Carnarvonshire, and perhaps in Anglesey. It is found under various forms; among these being, Herr J. Freyn says, "fere typicus f. perhirsutus Freyn" from Nant Francon; "forma adpressa-hirsuta" from between Aber and Llyn an Afon (about 500 ft. altitude); and "forma depauperata" on the rocks (at 2200 ft.) above Llyn an Afon. At Llanberris a form occurred by the river near its junction with Llyn Peris, which Freyn names "forma 3 Freyn in A. Kerner's Schedæ, v. p. 45 (*R. acris* Jord. non Linn.)." This also occurs at Bodorgan in Anglesey.

R. Lingua L. Fine specimens in Cors Bodeilio, Anglesey.

Caltha palustris L. var. *minor* Syme. Occurs at 2700 ft. on Glydyr Fawr.

**C. radicans* Forster. Plants coming nearer to Forster's than

any I have previously seen occurred in some plenty near Dolbadarn Castle, Carnarvonshire. There was some amount of variation in the leaf-cutting and in the shape of the leaves, but on the whole they were more acutely cut than normal *pratensis*, and less cordate in shape; the flowers were considerably smaller, but as the flowering season was nearly over, it will be well to collect it earlier in the season to see if this is constantly the case. The plants were uniformly rooting at the nodes. This is a new record, not only for the Principality, but I believe also for England.

Papaver dubium L. Bodorgan, Anglesey; Aber, Abersoch, Carnarvonshire, &c. All †*P. Lamottei*.

Meconopsis cambrica Vig. Marked as "Alien" in Griffith's *Flora*, but surely native, in Cwm Idwal, &c. First recorded in Ray, Cat. Plant. Ang. 1670.

Fumaria Boræi Jord. Conway.

F. densiflora DC. Found by me in 1884 near Holyhead, Anglesey.

Capnoides claviculata Druce. Plentiful in the grounds of the Victoria Hotel, Llanberris.

Roripa palustris Bess. †2. Deganway, Carnarvonshire.

Barbarea præcox Br. About the Llanberris Slate Quarry rather plentifully.

Arabis petræa Lam. On the Clogwyn Du yr Arddu. This form has larger petals than those of the Cairngorms, though not so large as those of the Ben Laoigh plant, but the leaf-cutting is very different from the latter variety. I only saw the glabrous plant, but Mr. Griffith records var. *hispida* DC. There is a capital figure in the *Hortus Elthamensis*, t. 61, p. 71, drawn from a Snowdon plant. It did not appear to descend below 2000 ft. on the Clogwyn rocks.

Cardamine pratensis L. The †var. *palustris* (Petermann) is the common form in both counties, but true *pratensis* occurred in Nant Francon?

Cochlearia alpina H. C. Wats. Clogwyn Du yr Arddu, 2500 ft.; also on Cwm Idwal.

**C. micacea* Marshall. With the above. The Rev. E. S. Marshall says, "I think it is *micacea*"; if so, new to England.

Brassica rapa L. †var. *Briggsii* H. C. Wats. On slate *débris*, Llanberris.

B. sinapioides Roth. (*B. nigra* L.). Llangefnai, Llanerchymedd, Anglesey.

**Camelina sativa* Crantz. Near the railway at Aber; a casual.

Viola Riviniana Reichb. Said to be rather rare by Mr. Griffith, but I saw it in many places in both counties, as near *Llangefnai, in Anglesey, N. C. R. for Anglesey.

Polygala vulgaris L. A handsome form occurs on the cliffs of Cwm Idwal, and was recorded by the Rev. A. Ley as the var. *grandiflora* Bab.; but it is not identical with the true *grandiflora* from Ben Bulben. Herr Freyn says it approaches *P. Saltelis* Legrand, "sed erectis, floribus majoribus." It is worth further study.

P. serpyllacea Weihe †var. *mutabilis* (Dumortier, Fl. Belg. Prod. p. 31) Rouy & Fouc. Fl. Fr. iii. p. 75. On the sands of Aberffraw,

Anglesey, *teste* Herr Freyn. The type occurs near Llyn Idwal, at Aber, &c., and I found it at the Stack Rocks, Holyhead, in 1884.

**Saponaria Vaccaria* L. By the railway at Aber, Carnarvonshire; a casual.

S. officinalis L. †3. About five miles from Pwlheli.

**Silene dichotoma* Ehrh. In a clover field near Holyhead, Anglesey; a casual.

S. anglica L. Near Dulas Bay, Anglesey.

†*Lychnis alba* × *dioica*. Near Deganway, Carnarvonshire.

Arenaria verna L. †var. *montana* (Fenzl ap. Ledeb. Fl. Ross. i. 349) sub-var. *glandulosa* Rouy & Fouc. *Flore de France*, iii. 269, is the prevailing form on the cliffs of Cwm Idwal and Clogwyn Du yr Arddu. "Plante presque entièrement pubescente-glanduleuse."

**Sagina ciliata* Fries †var. *ambigua* (Lloyd) Corbière. At Bodorgan, Anglesey, and Aber, Carnarvonshire, *teste* Freyn; N. C. R. for Anglesey.

**S. apetala* Hard. var. *glaberrima* Koch. Holyhead.

S. nodosa E. Mey var. *glandulosa* (Besser). Aberffraw, Anglesey.

S. procumbens L. Flore pleno, H. Davies; see specimens in Herb. Brit. Mus. from Beaumaris.

Spergula sativa Boenn. †2. Near Llanberris.

Herr Freyn suggests the name *Sagina ciliata* var. *filicaulis* (Jord.) Corbière for a plant gathered at Aber, but I should rather put it under *S. apetala*.

Buda rupestris Druce. Great Orme's Head, Holyhead, Anglesey.

**Montia rivularis* Gmel. (*M. fontana* var. *major* All.). In ditches near Bodorgan, Anglesey; near Llanberris and Aber, Carnarvonshire.

Elantine hexandra DC. †var. *sessiliflora* Druce, Fl. Berks. p. 105. Growing with the type in Llyn Padarn, but very rare; Carnarvonshire.

Lavatera arborea L. Abersoch.

Erodium cicutarium L'Hér. †var. *micranthum* Beck, Fl. Nieder Oestrr. p. i. 563, *teste* Freyn. On the sands of Aberffraw, Anglesey; and at Pwlheli, Carnarvonshire.

E. maritimum L'Hér. Ascends to 500 ft. on the Orme's Head.

**Impatiens glandulifera* Royle. Escape from cultivation at Aber, and on waste ground at Conway.

Genista tinctoria L. Abundant near Llanerchymedd, and Penrhos Llwigy, Anglesey.

Ulex europæus L. Curious-shaped bushes caused by sheep nibbling the branches so long as they are within their reach, but the uppermost ones spread out in the ordinary manner; the effect produced is very striking.

Ononis repens L. †var. *inermis* Lange. Occurs plentifully on Aberffraw Common, Anglesey. This is doubtless the locality cited in Rep. of Bot. Exch. Club for 1882, where "Mona" was suggested to be the Isle of Man, but—as Dillenius was the original authority for its occurrence "in Insula Mona," and as he only visited Anglesey—we may confidently identify his locality with the Welsh island. †It also occurs on the sands near Pwlheli, Carnarvonshire.

Melilotus officinalis Lam. Near Aber, Carnarvonshire.

Trifolium arvense L. †var. *strictius* Koch in Fl. Deutsch. v. 270. On the slate *débris* at Llanberris quarries. Freyn says it is synonymous with *T. Brittingeri* Weitenweber.

T. striatum L. Aberffraw Common.

Lotus corniculatus L. var. *crassifolius* Pers. Llandudno.—f. *rubriflora*. Stack Rocks.

Lathyrus sylvestris L. Near Pwlheli.

L. montanus Bernh. Cwm Idwal; Clogwyn Du yr Arddu at 2000 ft.

Prunus spinosa L. †forma *prostrata*. A singularly prostrate form occurred on the wind-swept rocks of the Great Orme.

P. insititia L. †3. Near Pwlheli, with †*P. domestica* L. and †*P. avium* L.

P. Padus L. †3. Between Pwlheli and Llanaelhaiarn.

**Rubus ammobius* Focke. A bramble which I gathered at Aber was named as above, without any expression of doubt, by Dr. Focke, but the Rev. W. Moyle Rogers would like to see more before definitely pronouncing in its favour. If correct, it is a new British record.

R. plicatus W. & N. Pwlheli.

R. rhamnifolius W. & N. †var. *dumulosus* Focke. Llanberris.

R. hirtifolius Muell. & Wirtg. A form near *R. mollissimus* occurred at Llanberris.

R. micans Gren. & Godr. Llanberris, and a glabrate form at Aber.

R. lentiginosus Lees (*R. cambricus* Focke). Not unfrequent about Llanberris.

R. mucronatus Blox. A plant near this was gathered at Llanberris, which Dr. Focke says is a western form for which at present he has no name.

R. Marshalli Focke & Rogers †var. *semiglaber* Rogers. Near Aber and Bethesda, Carnarvonshire.

R. rosaceus W. & N. †var. *Purchasianus* Rogers. Bethesda, Carnarvonshire; *teste* Focke.

R. pulcherrimus Neum. Penrhos, Anglesey, 1884.

R. latifolius Bab. *Pwlheli.

**R. leucandrus* Focke. Holyhead, but Dr. Focke does not name it with certainty.

Spiræa Filipendula L. f. *nana*. A dwarf form three inches high on the wind-swept slopes of the Great Orme's Head.

Potentilla reptans L. †var. *microphylla* Tratt. On the sands of Llandudno Warren.

Alchemilla vulgaris L. †var. *minor* (Huds.) = var. *filicaulis* (Buser). Nant Francon, Llanberris, &c., Carnarvonshire. — †Var. *alpestris* (Schmidt). Cwm Idwal, &c.

Rosa mollissima Willd. (*R. tomentosa* Sm.) f. *alba*. Near Llanerchymedd, Anglesey.—Var. *scabriuscula* (Sm). By the Menai Straits, Carnarvon.

**R. dumetorum* Thuill. Banks of the Menai, Aber, and Llandudno, Carnarvonshire; Bodorgan, Anglesey.

**R. dumalis* Bechst. Near Llangeffni, Anglesey.

Pyrus Aucuparia L. Cliffs of Clogwyn, at 2800 ft.

Cratægus Oxyacantha L. (*C. monogyna* Jacq.) forma *prostrata*. Only a few inches high, on stony cliff, over which it spread itself in full sun and wind exposure.

Callitriche stagnalis Scop. Rather frequent about Bodorgan, Anglesey; also in *Nant Francon and at Aber, Carnarvonshire. — *Var. *platycarpa* (Kuetz). Aber and Llanberris, Carnarvonshire.

**C. obtusangula* Le Gall. *Between Deganway and Llandudno, Carnarvonshire; Bodorgan, Anglesey.

Epilobium obscurum × *palustre*. †3. Near Pwlheli. I gathered *E. obscurum* at Valley in 1884.

Œnothera biennis L. Near Pwlheli; alien.

Pimpinella Saxifraga L. At 2300 ft. on Clogwyn Du yr Arddu.

Galium boreale L. Llyn an Afon, Carnarvonshire.

G. Aparine L. f. *condensata*. A small form with narrow leaves grew on the coast near Penrhos in 1884.

**Anthemis tinctoria* L. Near Aber; a casual.

Chrysanthemum Leucanthemum L. A very dwarfed form on the Great Orme's Head; monocephalous, and only two inches high. A curious form occurs on the rocks of Cwm Idwal.

**Matricaria discoidea* DC. A North American species, quite established near Aber railway-station, Carnarvonshire.

Crepis virens L. †var. *agrestis* (Waldst. & Kit.). Near Holyhead.

Arctium minus Schukhr. Holyhead, 1884.

Hieracium sciaphilum Uechtr. Menai. 3. Llanbedrog, Carnarvonshire. *Bodorgan, Anglesey.

H. vulgatum Fries. Bodorgan, Anglesey.

Solidago Virgaurea L. The very dwarf form, 1–2 inches high, with a capitate spike of a few rather large flowers, which grows on the wind-swept Stack Rocks, Anglesey; developed, when planted in ordinary soil at Oxford, into an ordinary spicate form.

Leontodon hirtum L. Aberffraw, Anglesey.

Taraxacum officinale [Weber] ex Wigg. †var. *alpinum* Koch, Syn. p. 428 (1837). Great Orme's Head (400 ft.).

T. lævigatum DC. Llandudno Warre, Carnarvonshire.

T. palustre L. Cliffs of Cwm Idwal, Carnarvonshire.

Hypochæris radicata L. †var. *hispida* Peterm. Aberffraw, Anglesey.

Armeria maritima Willd. †var. *vulgaris* (Willd.) *Statice pubescens* Link. Dulas Bay, Holyhead, Anglesey; Aber, Crib Goch, Clogwyn Du yr Arddu, Glydryr Faur (Herb. Babington).

**Gentiana baltica* Murb. Aberffraw, Anglesey.

Myosotis repens Don. Abundant near Llyn Coron, near Holyhead, &c., Anglesey; Nant Francon, Aber, &c., Carnarvonshire.

Anagallis arvensis L. †f. *pallida*. In damp sandy places, growing with *A. tenella*. A form with very flaccid leaves and pale flesh-coloured flowers was found on Aberffraw Common, which at first I thought might be a hybrid of the two species, but closer examination failed to reveal the presence of *A. tenella* in it.

A. tenella L. A pretty form with larger and more rosy-coloured flowers, and wiht smaller leaves, grew on the Stack Rocks in 1884.

**Verbascum virgatum* Stokes. As an escape or casual at Aber, Carnarvonshire.

Linaria viscida Moench. Noticed by me at Holyhead in 1884.

Antirrhinum majus L. On the walls of Conway Castle.

Mimulus Langsdorffii Donn. (*M. guttatus* DC.) Near Llandudno, and plentiful near the river at Llanberris, Carnarvonshire.

Veronica Anagallis-aquatica L. †var. *anagalliformis* (Boreau). In marshy ground near Llyn Coron, Anglesey.

Melampyrum pratense L. †var. *hians* Druce. Plentiful about Dolbadarn Castle, and in other bushy and rocky places about Llanberris, and at Aber, Carnarvonshire.

**Euphrasia borealis* Wetts. Bodorgan, Anglesey.

**E. curta* Fries. Llyn Coron side, Aberffraw, &c., Anglesey.

**E. curta* var. *glabrescens*. South Stack, Llyn Coron, Penrhos Llwigy, Anglesey.

**E. brevipila* Burnat & Gremli. Llanberris, Carnarvon, Cors Bodeilio, Anglesey.

**E. brevipila* × *curta* vel *Rostkoviana*. Llanberris.

**E. Rostkoviana* Hayne. Glydyr Fawr, Carnarvon.

Bartsia Odontites Huds. †var. *verna* (Reichb.). Bodorgan, Anglesey.

Utricularia minor L. Near Llanaelhaiarn, Carnarvonshire.

Plantago Coronopus L. †var. *pygmæa* Lange. Dillenius found this on Aberffraw Common, where it still occurs. A hairy plant from the rocky coast between Pwlheli and Abersoch, Mr. E. G. Baker says, may be a hairy form of var. *maritima* Gren. & Godr.

Atriplex littoralis L. †var. *serrata* (Moq.-Tand.). Near Conway.

A. laciniata L. †3. Sands near Pwlheli.

Euphorbia exigua L. Bodorgan, Anglesey.

Ulmus campestris L. (*U. montana* Stokes). The Wych Elm. †3. Near Pwlheli.

Parietaria ramiflora Moench (*P. officinalis* Auct.). Certainly native on the limestone rocks of the Great Orme's Head.

**Salix purpurea* L. By the River Llwigy, near Penrhos Llwigy, Anglesey.

Populus tremula L. †var. *glabra*. Near Bangor.

P. canescens Sm. Near Deganway, Carnarvonshire.

P. nigra L. Near Pwlheli, Carnarvonshire.

Epipactis palustris Crantz. By the roadside near Llangefni, and abundant at Cors Bodeilio, Anglesey.

Orchis incarnata L. †var. *lanceata* (Reichb. f. Ic. Fl. Germ. xiii. 51, t. 45). Border of Llyn Coron, Anglesey, with "labello acute trifido," *teste* Freyn.

†*O. incarnata* × *maculata*. Bodorgan, Anglesey.

O. maculata L. †var. *carnea* Tin. Bodorgan, Anglesey (Fl. Luxemb. (1836), 441).

Lloydia alpina Salisb. Appears to be limited to an altitude of 1800–2500 ft.

Juncus Gerardi Lois. Trego, 1884. Dulas Bay, Anglesey; Conway, Abersoch, Carnarvonshire.

J. obtusiflorus Ehrh. Cors Bodeilio, Anglesey.

Typha latifolia L. Near Llandudno.

Potamogeton coloratus Du Cros. Cors Bodeilio, Anglesey.

P. lanceolatus Sm. Still plentiful in the River Lligwy, Anglesey. First recorded in E. B. t. 1985 (1809).

P. Griffithii Arthur Bennett. In 1899 I was able, after some considerable difficulty and discomfort, to procure rooting specimens of this curious plant, which is very difficult to reach without a boat; and, as Llyn an Afon is six miles above Aber, it is very troublesome to get a boat transported there; I solved the difficulty by going in the icy water for it; and it is now growing in Mr. Fryer's garden.

P. nitens Web. The earliest printed record for this plant in Britain is to be found in Richardson's Correspondence, p. 259 (1835), where Dillenius's interesting account of his journey into Wales is printed *in extenso*. Dillenius wrote this letter in 1726, and he says that "in a small river that runs out of a pond near Esquire Baly's, I observed Potamogeton foliis oblongis, planis, . . . inferne alternis, superne constipatis." The specimen referred to is preserved at Oxford, and is *P. nitens*. Another pondweed is mentioned by Dillenius—Potamogeton, Lapathi minoris foliis pellucidis. D. Lhwyd"; this is *P. polygonifolius*, and the earliest Welsh record.

P. gramineum L. *P. heterophyllus* Schreb. Valley, 1884, Anglesey.

Eleocharis uniglumis Schult. Stack Rocks, 1884.

Echinodorus ranunculoides Engelm. var. *repens* (Davies). On the borders of Llyn Coron, abundantly, Anglesey.

Carex disticha Huds. A form with interrupted spike grew near Llyn Coron, Anglesey, and in a marsh near Llyn Padarn, Carnarvonshire, which Pfarrer Kukenthal says is a form with transparent glumes and elongate spikelets, reminding one somewhat of *C. repens* Bellardi. The type was plentiful at Cors Bodeilio, Anglesey.

C. muricata L. As *C. contigua* Hoppe near Bodorgan, Anglesey; and 3. Abersoch, Carnarvonshire.

C. diandra Schrank †var. *major* (Ehrh.). Cors Bodeilio.

C. Goodenowii Gay var. *elatior* (Lang). Cors Bodeilio, Anglesey; also the †form *melæna*, in Llyn Cwm, 2000 ft., Carnarvon, and in Cors Bodeilio; and the †forms *latifolia* (Kukenthal) and †var. *chlorostachya* Reichb. in the same marsh.

C. sylvatica L. †3. Near Pwlheli; also at Llanberris, Carnarvonshire.

C. distans L. Dulas Bay, Anglesey; Abersoch, Carnarvonshire.

C. rostrata Stokes. In Llyn an Afon, where Mr. Griffith records var. *elatior* Blytt, but I could only see the type. An alpine form occurs in Llyn Cwm, but here again I could see no var. *elatior*.

**Alopecurus myosuroides* Huds. As a casual near Conway.

Recorded for both vice-counties by Robinson in Top. Bot., but not given in Griffith's *Flora*.

Agrostis alba L. †var. *coarctata* (Hoffm.). Bodorgan, Anglesey; near Llandudno and Pwlheli, Carnarvonshire.— †Var. *maritima*. At Abersoch, Carnarvonshire, and Aberffraw, Anglesey.

Cynosurus cristatus L. †forma *cuprea*. With dark copper-coloured florets on Aberffraw Common, Anglesey.

Panicularia fluitans Kuntze †var. *pedicellata* (*Glyceria pedicellata* Towns.). In a marsh near Llanberris, Carnarvon.

P. maritima Kuntze. Plentiful on Deganway Marsh, Carnarvonshire.

**P. plicata* Druce. In pond near Valley, 1884.

Molinia varia Schrank. At 2300 ft. on Snowdon.

Bromus hordeaceus L. Sp. Pl. ed. i. and *B. mollis* L. Sp. Pl. ed. ii. var.; †var. *molliformis* (Lloyd) = *Lloydianus* (Syme), *teste* Hackel. Near Aberffraw Common, Anglesey.

Agropyron junceum Beauv. Dulas Bay, Anglesey.—†Var. *megastachyum* Fries (*Mantissa*, iii. p. 12, sub *Triticum*), Hackel, *in lit.* Abersoch sand-hills; and also at Pwlheli. New to Britain.

Botrychium Lunaria L. Great Orme's Head, Llanberris. First recorded from Penmaenmawr in Ray's Catalogue of 1670.

Equisetum maximum Lam. Near Penrhos Lliwgy, Anglesey; Llanaelhaiarn, Carnarvonshire.

Aira caryophyllea L. forma. Occurred by the Menai Straits, near Bangor, with more fasciculated panicles than the type, but not so much as in the var. *aggregata*.

Avena pubescens Huds. †var. *glabra* Gray, in Nat. Arr. Br. pl. ii. 131, with smooth leaves and leaf-sheaths, occurred on the rocks of Cwm Idwal.

Arrhenatherum avenaceum Beauv. Bodorgan, Anglesey; Llanberris, and near Abersoch, &c., Carnarvonshire; Ruabon, Montgomeryshire. In all cases in uncultivated ground.

Phragmites communis Trin. †var. *nigricans* Gren. & Godr. Near Aberffraw, Anglesey; near Llanberris, Carnarvonshire.

**Festuca Myuros* L. Aber, Carnarvonshire.

F. rubra L. †subvar. *barbata* Hackel. On maritime rocks near Aberffraw, Anglesey, and from the rocks of Twl Dhu and Clogwyn Du yr Arddu, Carnarvonshire, at 2000 ft.—f. *littoralis* Hackel. Near Penrhos, Anglesey.

Poa nemoralis L. A pretty form occurs on the cliffs of Cwm Idwal, Carnarvonshire.

Bromus secalinus L. Near Conway, Carnarvonshire. A casual.

Lolium temulentum L. Near Aber, Carnarvonshire. A casual.

Dryopteris Filix-mas Schott var. *abbreviata* (Newman). Snowdon.

NOTES ON AFRICAN CONVOLVULACEÆ.—II.

By A. B. Rendle, M.A., D.Sc.

In working out the *Convolvulaceæ* in some African collections recently presented to the Department of Botany, I find a few species which are new or otherwise worthy of record.

Mr. H. T. Ommanney collected in the Johannesburg district; Captain Barrett-Hamilton eighty to one hundred miles further south, across the Vaal river. The specimens will be found in the National Herbarium.

Convolvulus Randii sp. nov. Erecta suffruticosa argenteo-sericeo-pubescens, ramis fastigiatis teretibus, superne flexuosis; foliis parvis, ascendentibus, lineari-lanceolatis, obtusiusculis, breviter petiolatis; floribus vix mediocribus, axillaribus, sæpissime solitariis, pedunculis tenuibus, sæpius folia haud æquantibus, bracteolis parvis, filiformibus; sepalis coriaceis, ovatis acutis, tribus exterioribus quam interiora paullo longioribus; corolla calycem duplo superante, infundibulare, quinquefida, areis mesopetalis extus sericeo-pubescentibus; capsula truncato-turbinata, apice abrupte pungente, seminibus compressis, atris, crustaceis.

Apparently a low shrub, the suberect branches arising in a tuft at the end of the decumbent stem or main branch. Branches 30–40 cm. high, 1·5 mm. in diameter or less at the base, and densely leaved from above the base upward. Except on the lower older part the branches bear a short appressed silvery silky pubescence, which is specially dense on the young upper parts of the shoots. Leaves 2–2·7 cm. long, 3–4 mm. wide, petiole 2 mm. long or less, more densely pubescent on the lower surface.

Peduncles 1·5–2 cm. long or shorter, rarely branched and bearing a second flower; bracteoles 4–5 mm. long, at about the middle of the flower-stalk. Sepals pubescent, like the leaves, where exposed, 1 cm. long, the inner slightly shorter. Corolla 2 cm. long. Filaments 6·5–8 mm. long, anthers 2·5 mm. Style branched at the middle, narrow-linear, style arms 5 mm. long. Disc at base of ovary narrow. Capsule shortly pungent, 4 mm. long, and as broad in the upper part.

A very distinct species of the non-climbing shrubby set of the genus. In its indumentum it resembles the eastern *C. holosericeus* Bieb., some forms of which also approach it in habit.

Hab. Rhodesia; Gwelo district, late December 1897. In woods, *Dr. R. F. Rand*, no. 274.

Seddera capensis Hallier f. var. minor, var. nov. Suffrutex humilis, ramis sicut foliorum, bractearum et sepalorum pagina infera albido-hirsutulis, pilis patentibus; foliis quam in typo minoribus.

Branches to 15 cm. long; leaves not exceeding 6 mm. long by 3 mm. (rarely uearly 4 mm.) broad; corolla barely 1 cm. long.

Distinguished from the species by its hoary indumentum, and very small leaves.

Hab. Leeuw Spruit and Vredefort, Orange River Colony, 1901–2, Capt. G. C. H. Barrett-Hamilton.

Ipomœa Ommannei sp. nov. Herba procumbens caulibus sexpedalibus vel supra, validis, lactentibus, in partibus junioribus albido-alibi ferrugine-pubescentibus; foliis magnis breviter petiolatis, lanceolatis, basi rotunda vel subcordata, apice obtusiusculo, margine crispula dense ciliolata, junioribus pilis sericeis fulvo-argenteis appressis densis utrinque indutis, adultis cum indumento minus lucente; floribus inter majores in cymis axillaribus, densis, multifloris, capituliformibus, pedunculatis, aggregatis; bracteis inferioribus specie involucratis, ovatis, acuminatis, superioribus velut sepalis, lanceolatis, acuminatis, bracteis et sepalis dorso sericeis, et margine ciliolatis; sepalis exterioribus duobus quam interioribus valde latioribus; corolla subrosea, infundibulare, fasciis 5 mesopetalis, extus subsericeis, utrinque nervo limitatis.

A striking plant, the trailing stems reaching "6 feet or more" in length, and ·5 cm. or more in diameter. They are described as "succulent and milky." Leaves to 21 cm. long by 9 cm. broad above the base, midrib strongly projecting on the under surface, petioles 2 cm. or less. Peduncles strong, 6–11 cm. in length. Flowers in a dense cymose head; lower bracts large and forming an involucre, 3–3·5 cm. long by 9 to 12 mm. broad, the higher bracts narrower and resembling the outer sepals. Sepals about 3 cm. long, the inner a little shorter than the outer; outer 8 mm., innermost 3 mm. broad. Corolla "magenta, not conspicuous as compared with the foliage," 5 cm. long; filaments of stamens unequal, not exceeding half the length of the corolla; anthers sagittate, 7 mm. long; disc cup barely 1 mm. long.

A very distinct species of the section *Pharbitis*, subsection *Cephalanthæ*.

Hab. Johannesburg; Jan. 7th, 1902. Begins to grow in November. Coll. H. T. Ommanney.

Mr. Ommanney also collected *Ipomœa crassipes* var. *longepedunculata* Hall. f.

Ipomœa Barretti sp. nov. Suffrutex ramosa, ramis procumbentibus, ramulis tenuibus, ascendentibus, ut foliis albido-puberulis; foliis parvis, breviter petiolatis, lineari-oblongis, integris, obtusis, specimine plicatis et in facie superiore glabris; floribus axillaribus solitariis, brevissime pedicellatis, bracteolis linearibus et sepalis (qua expositis) albido-puberulis; sepalis ovatis acutis, subæqualibus; corolla calycem plus duplo excedente, areis mesopetalis dorso albido-puberulis.

The brown woody stems reach 4 mm. in thickness; the slender leafy shoots reach 20 cm. in length (stems 2 cm. or less in diameter), and are of a dull sage-green hue. Leaves 2 cm. or less in length by 3 mm. or less in breadth. Flower-stalks 2–3 mm. long, bracteoles 4–5 mm. Buds conical. Sepals 10–11 mm. long. Corolla (in withered flower) 2–5 cm. long; purple?

A distinct species of Hallier's section *Calycanthemum*, characterized by its low bushy growth, small narrow leaves, and solitary axillary flowers.

Hab. Leeuw Spruit and Vredefort, Orange River Colony, Capt. G. C. H. Barrett-Hamilton, 1901–2.

Captain Barrett-Hamilton also collected *Ipomæa obscura* Ker., *I. plantaginea* Hall. f., *I. bathycolpos* Hall. f., and *I. argyreoides* Choisy.

NORTH DONEGAL MOSSES.

By J. Hunter.

While Mr. H. C. Hart's *Flora of Donegal* has supplied botanists with a full account of the flowering plants, it is a matter of regret that so little has yet been done in the investigation of the Moss Flora of this interesting county. Mr. H. N. Dixon, in this Journal for December, 1891, pp. 359–362, has a short paper on the mosses collected by him during a brief visit in July, 1890, and this seems to be the last contribution to the very meagre bryological literature dealing with the county. During a residence of some years in the northern portion of Donegal, I paid a little attention to the mosses, but the list which I subjoin can hardly be considered as more than a partial contribution to the bryology of the district. As such, however, it may possibly be considered interesting and suggestive in the absence of a more complete record.

My investigations have been mainly confined to the valley running from the city of Londonderry north-westward to Fahan, Lough Swilly, and thence along the eastern shore of the lough to Buncrana, in the neighbourhood of which I have explored largely. I have also visited, but only for a few hours, a portion of the western shore of Lough Swilly, which is interesting as possessing features more characteristic of the Donegal landscape in its wilder aspect. In a little wood, named Carradoan, on the slope of a hill, I seemed to be transported to an altogether different climate. The mildness and humidity of the atmosphere had encouraged the growth of Mosses and Hepaticæ to such an extent that they formed a miniature jungle difficult to investigate on account of their abundance and the size they had attained in this favoured locality. The beautiful hepatic *Lepidozia cupressina* Sw. occurred in the greatest profusion, while *Tetraphis pellucida* Hedw. carpeted the ground, and was found in fine fruit. Many such spots are, I believe, scattered over the county, and will no doubt furnish rich finds to bryologists in the future. It will readily be surmised that, owing to the great extent occupied by bog in Donegal, the *Sphagna* are largely represented, but I regret that my list is very incomplete in regard to this class. The older system of nomenclature has been so recently replaced in this country by the fuller and more natural arrangement of Warnstorf, that I have not yet been able to bring all my collections up to date. However, I hope later on to deal more completely with this group, and also with the *Andreæ*, and other similar mosses, whose absence in my list is accounted for by my not having yet explored the higher hills and mountains, which I hope, however, to do in the ensuing summer.

My thanks are due to Mr. H. N. Dixon and Dr. Stirton for

assistance in identification, as well as to Mr. E. C. Horrell for help in regard to the *Sphagna*. I may add that I have followed in the nomenclature Dixon's *Student's Handbook*, and Horrell's *European Sphagnaceæ*. I have only given localities for the less commonly occurring species.

Sphagnum fimbriatum Wils. Margin of rill, south side of Scalp Mountain, near the base. — *S. Girgensohnii* Russ. Marsh beside Illies River, Buncrana. — *S. rubellum* Wils. — *S. fuscum* Klinggr. Grianan Hill. — *S. quinquefarium* Warnst. Common about Buncrana. — *S. subnitens* Russ. & Warnst. — *S. molle* Sulliv. Grianan Hill. — *S. squarrosum* Pers. Bog near Birdstown. — Var. *spectabile* Russ. Portaw Glen, Buncrana. — *S. teres* Angstr. Trillick Banks, Buncrana. — *S. cuspidatum* Russ. & Warnst. — *S. pulchrum* Warnst. Ballinarry Hill, Buncrana. — *S. recurvum* Russ. & Warnst. — *S. molluscum* Bruch. Grianan Hill. — *S. compactum* DC. Ballinarry Hill. — *S. inundatum* Warnst. Portaw Glen. — *S. rufescens* Warnst. — *S. cymbifolium* Warnst. — *S. papillosum* var. *normale* Warnst. forma *conferta* (Lindb.) Warnst. — *S. medium* Limpr. var. *roseum* Warnst. Bog on east side of Buncrana. (In the same habitat what appears to be *S. acutifolium* Ehrh. var. *elegans* Braithw. occurs = ? *S. Russowii* Warnst. var. *rhodochroum* Russ.

Andreæa Rothii Web. & Mohr. Rocky sides of river at Trillick Banks, Buncrana (approximate altitude 200 ft.). A curious habitat and low elevation for this moss. It is probable the spores have been carried from Scalp Mountain, some three miles distant, near whose summit—at about 1400 ft.—I have also found this species.

Tetraphis pellucida Hedw. Carradoan Wood, west side of Lough Swilly; abundant, and with fruit.

Catharinea undulata Web. & Mohr.

Oligotrichum incurvum Lindb. Grinan Hill, and in fields adjacent thereto.

Polytrichum nanum Neck. — *P. aloides* Hedw. — *P. urnigerum* L. — *P. piliferum* Schreb. — *P. juniperinum* Willd. — *P. commune* L.

Pleuridium subulatum Rabenh.

Ditrichum homomallum Hampe. Roadside banks between Burt and Londonderry. — *D. flexicaule* Hampe. Very abundant on sandy links about Lough Swilly.

Swartzia inclinata Ehrh. Stony ground at Ballyliffin Strand.

Ceratodon purpureus Brid.

Dichodontium pellucidum Schimp. — *D. flavescens* Lindb. Bridge End River, Buncrana River, and others. A characteristic species of the mountain streams in North Donegal.

Dicranella heteromalla Schimp. — *D. cerviculata* Schimp. Bonnemaine Bog. — *D. crispa* Schimp. Ditch-bank, Grianan Hill, and sandy cutting, Millfield, Buncrana. — *D. varia* Schimp.

Blindia acuta B. & S. Common, especially by the sides of the mountain streams, and also on wet ground along the shores of Lough Swilly, where it descends to sea-level. At Buncrana shore occurs "a tall form showing a slight approach to the var. *trichodes*, but not that. I have gathered a similar form at the foot of Errigal [Co. Donegal] and elsewhere" (H. N. Dixon).

Dicranoweisia cirrata Lindb. Portaw Glen.

Campylopus flexuosus Brid. Birdstown Wood. — *C. pyriformis* Brid.—*C. fragilis* B. & S. The form *densus* seems to be commoner than the typical plant.—*C. atrovirens* De Not.—*C. brevipilus* B. & S. Buncrana and Tullagh Point, Clonmany. — *C. symplectus* Stirton. In round tufts embedded in detritus of mountain stream at Trillick Banks, near Buncrana. I am indebted to Dr. Stirton for the verification of this moss. He has found it also in Tarbert, Harris (Outer Hebrides), and has written a full account of it in the *Annals of Scottish Natural History*. Its external appearance is very distinctive, and microscopical examination shows fully its claim to specific rank. It belongs to the same group as *C. subulatus* Schimp.

Dicranum scoparium Hedw.—*D. Bonjeani* De Not. Ned's Point, Buncrana.—*D. majus* Turn. Portaw Glen, Carradoan Wood, Trillick Banks.—*D. fuscescens* Turn. Grianan Hill, Craigahashel Hill, Buncrana,

Leucobryum glaucum Schimp.

Fissidens bryoides Hedw. — *F. osmundoides* Hedw. Dripping banks at sea-shore, Ballinarry, Buncrana, and river-banks at Trillick.—*F. adiantoides* Hedw. This species, which is naturally an inhabitant of bogs and wet rocks on mountains, appears to be equally at home on the sandy ground about Buncrana sea-shore.—*F. taxifolius* Hedw.—*F. Curnowii* Mitt. Rocky sides of Bridge End River. An interesting addition to the Irish Moss Flora.

Grimmia apocarpa Hedw. Common. — Var. *rivularis* W. & M. Mill River and Castle River, Buncrana. — *G. maritima* Turn. — *G. pulvinata* Smith.—*G. trichophylla* Grev. Ballinarry, Buncrana.—*G. Hartmani* Schimp. Rock on Castle Hill, Buncrana.—*G. Doniana* Sm. Scalp Mountain.

Rhacomitrium aciculare Brid. — *R. fasciculare* Brid. — *R. heterostichum* Brid.—*R. lanuginosum* Brid. Often in fruit.—*R. canescens* Brid. and var. *ericoides* B. & S.

Ptychomitrium polyphyllum Fürnr.

Hedwigia ciliata Ehrh.

Acaulon muticum C. M. Ditch-bank, Bridge End, and near Buncrana Waterworks.

Phascum cuspidatum Schreb.

Pottia recta Mitt. Tennis-ground, Fahan Station. Top of Barrack Hill, Buncrana, and ditch-bank at Millfield, Buncrana. Apparently not rare in the district.—*P. Heimii* Fürnr. Macamish, and sea-shore at Ballinarry. Dr. Stirton remarks on the plant from this locality, that it is "that curious form of *Pottia Heimii* without serratures, and the nerving falling short." — *P. truncatula* Lindb.

Tortula ambigua Angstr. Ditch-banks, Buncrana, and lime-capped wall at Pennyburn Tunnel, near Londonderry.—*T. muralis* Hedw.—*T. subulata* Hedw. — *T. ruralis* Ehrh. Sandy ground at Portaw Beach, near Buncrana. This moss is apparently singularly rare in the district.—*T. ruraliformis* Dixon. Very abundant on sandy ground, shores of Lough Swilly. This beautiful species is so abundant as to form a marked feature of the coast landscape. It seems

to be common all along the west coast of Ireland, and occurs often in fruit.—*T. papillosa* Wils. Elm-tree at Millfield, Buncrana.

Barbula rubella Mitt.—*B. tophacea* Mitt.—Also var. *brevifolia*, at Buncrana. — *B. fallax* Hedw. — *B. rigidula* Mitt. Millfield, Buncrana. — *B. cylindrica* Schimp. — *B. revoluta* Brid. — *B. convoluta* Hedw. Dundrain, Bridge End.—*B. unguiculata* Hedw.

Weisia viridula Hedw. — *W. rupestris* C. M. Tullagh Point, Clonmany.—*W. verticillata* Brid. Wet rocks, Ballyliffin Strand.—*W. crispata* C. M. Banks by sea-shore, Portaw. Mr. H. N. Dixon writes to me that "it is a very interesting plant, being a form of *Weisia crispata* which I have never seen before; that species has usually narrower leaves than in *W. tortilis*, but here they are very wide, and very fragile." New to Ireland.

Trichostomum crispulum Bruch. Seaside banks, Buncrana.—*T. mutabile* Bruch. Seaside banks, Buncrana. — Var. *littorale* Dixon. Same locality. — *T. flavovirens* Bruch. Buncrana. — *T. tenuirostre* Lindb. Portaw Glen, Buncrana. — *T. nitidum* Schimp. Seaside banks, Buncrana.—*T. tortuosum* Dixon. Grianan Hill.

Cinclidotus fontinaloides P. Beauv. Mill River, Buncrana.

Eucalypta streptocarpa Hedw. Barrack Hill and Castle Mill Wall, Buncrana.

Anœctangium compactum Schwgr. Wet rocks above river-bed, Trillick, Buncrana.

Zygodon Mougeotii B. & S. Damp rocks, Mill River, Buncrana; and common on dripping rocks beside sea-shore, Portaw, Buncrana. —*Z. viridissimus* Br.

Ulota Bruchii Hornsch. Trees, Portaw Glen.—*U. crispa* Brid. —*U. phyllantha* Brid. Very common in the district. Occurs even on the rocks on the outer headlands of the coast, such as Fanad Point, where it is reached by the spray of the Atlantic. — *U. Hutchinsiæ* Hamm. On siliceous rock, Portaw Hill, Buncrana, at about 100 feet altitude.

Orthotrichum rupestre Schleich. Rocks at Tullagh Point, Clonmany. — *O. anomalum* Hedw. var. *saxatile* Milde. Grianan Hill; Macamish Point. — *O. affine* Schrad. — *O. pulchellum* Sm. Bridge End Glen.—*O. diaphanum* Schrad. Trees at Bridge End.

Splachnum ampullaceum L. Portaw Glen.

Ephemerum serratum Hampe. Garden at Bridge End.

Physcomitrium pyriforme Brid. Ditch-sides between Bridge End and Galliagh.

Fumaria ericetorum Dixon. Castle Hill, Buncrana.—*F. Templetoni* Sm. Common and characteristic of the riverside moss flora of North Donegal.—*F. hygrometrica* Sibth.

Aulacomnium palustre Schwaegr.

Bartramia ithyphylla Brid. Rocks in river glen, Trillick.—*B. pomiformis* Hedw. Ditch-bank, Dundrain, Bridge End.

Philonotis fontana Brid.

Breutelia arcuata Schimp.

Webera nutans Hedw.—Var. *longiseta* B. & S. Bonnemaine Bog, Bridge End.—*W. albicans* Schimp.

Bryum filiforme Dicks. Occurs in all the mountain streams.—

B. pallens Sw. Buncrana Waterworks. — *B. pseudo-triquetrum* Schwaegr.—[The closely allied species *B. bimum* Schreb. is almost sure to occur, and no doubt I have taken the preceding for it in many cases.] — *B. intermedium* Brid. Damp ditch-bank, Bridge End.—*B. cæspiticium* L.—*B. capillare* L.—*B. atropurpureum* W. & M. Buncrana.—*B. alpinum* Huds. Common along the shores of Lough Swilly, where it descends to sea-level. — *B. argenteum* L.—Var. *lanatum* B. & S. Slate roof of outhouse at Bridge End.—*B. roseum* Schreb. Sandy bank above Portaw Beach. A curious habitat for this moss.

Mnium rostratum Schrad. Shady banks of Bridge End River.—*M. undulatum* L.—*M. hornum* L.—*M. punctatum* L.

Fontinalis antipyretica L.

Neckera complanata Hübner. Trees and rocks in Castle Wood, Buncrana.

Homalia trichomanoides Brid.

Pterygophyllum lucens Brid.

Antitrichia curtipendula Brid. Rocks on hill above Rushfield, near Buncrana.

Porotrichum alopecurum Mitt.

Anomodon viticulosus Hook. & Tayl. Old wall at Greenfort, Portsalon.

Heterocladium heteropterum B. & S. By Buncrana River, near Richardson's Mill. — Var. *fallax* Milde. Wet rock in Dundrain Glen, Bridge End (*teste* H. N. Dixon).

Thuidium tamarisanum B. & S. Fruiting in Castle Wood, Buncrana. — *T. recognitum* Lindb. Sandy bank beside railway near Buncrana Station.

Climacium dendroides W. & M. Marshy ground between Bridge End and Galliagh. Occurs in a dwarf form on sandy links about Buncrana.

Cylindrothecium concinnum Schimp. Portaw, Buncrana; and abundant on railway-banks below Barrack Hill, Buncrana.

Isothecium myurum Brid.

Pleuropus sericeus Dixon.

Camptothecium lutescens B. & S. Abundant on sandy ground about Buncrana sea-shore. It is interesting to note the characteristic species of this coast moss flora. They are *Ditrichum flexicaule*, *Tortula ruraliformis*, the dwarf form of *Climacium dendroides*, and *Camptothecium lutescens*. Apparently contrary to what takes place elsewhere, *Tortula ruraliformis* fruits abundantly.

Brachythecium albicans B. & S. Portaw Bay and Coneyburrow, Buncrana.—*B. rutabulum* B. & S.—*B. rivulare* B. & S. Mill River, Buncrana; at Trillick Banks.—*B. velutinum* B. & S.—*B. populeum* B. & S.—*B. plumosum* B. & S. Castle River and Mill River, Buncrana.—*B. purum* Dixon.

Hyocomium flagellare B. & S. Common. With fruit in Bridge End Glen (1899). I may here remark that, so far as I have observed, the number of barren species in Donegal is apparently much less than elsewhere; at least, judging from the records, and from personal observation in other localities. This may perhaps

be due to the humid atmosphere and mild climate of the western coast encouraging a more luxuriant vegetative growth, and at the same time stimulating the reproductive organs.

Eurhynchium piliferum B. & S. — *E. prælongum* B. & S. — *E. Swartzii* Hobkirk. — *E. myosuroides* Schimp., var. A peculiar variety, which Mr. H. N. Dixon states is the same plant as that mentioned by Dr. Braithwaite from Ben Clibreck, occurs on dripping rocks at seashore, Portaw, Buncrana. — *E. striatum* B. & S.— *E. rusciforme* Milde. — *E. murale* Milde. Wall at Bridge End.— *E. confertum* Milde.

Plagiothecium Borrerianum Spruce. Portaw Woods, Carradoan Wood, Trillick Banks, and Scalp Mountain.—*P. denticulatum* B. & S. —*P. undulatum* B. & S. Portaw Woods, Trillick Banks, Carradoan Wood. In the last locality this moss occurs in the greatest profusion, and fruits abundantly.

Amblystegium serpens B. & S. — Var. *salinum*. Sandy links at Buncrana and Portaw.—*A. filicinum* De Not.—*A. radicale* B. & S. var. *serotinum*. I gathered what seems to be this, according to Dr. Stirton, on links at Buncrana; but the specimens were poor, and there is consequently a little uncertainty as to their correct naming.

Hypnum polygamum Schimp. Wet sand at Tullagh Point, Clonmany.—*H. stellatum* Schreb. The typical plant common, and var. *protensum* B. & S. occurs on wet places by the sea-shore at Portaw. —*H. chrysophyllum* Brid. Sandy ground above Portaw Bay, Buncrana. Mr. H. N. Dixon writes :—"I sent your *H. chrysophyllum* from L. Swilly to Mr. Bagnall, who says : 'The *Hypnum* appears to be dioicous, and just resembles in habit and structure *H. chrysophyllum* var. *erectum* mihi. I have compared it with my Dovedale plants, and can see no real difference.'" — *H. aduncum* Hedw. var. *Kneiffii* Schimp. Salt marshes near Inch Road, Lough Swilly (Mr. H. C. Hart, Journ. Bot. Dec. 1886).—*H. fluitans* L. — *H. exannulatum* Gümb. Grianan Hill. — *H. revolvens* Sw. — *H. commutatum* Hedw. Inch Island, by sea-shore ; Ballyliffin.—*H. falcatum* Brid. The typical plant common. The aquatic form occurs in conspicuous tumid masses on wet side of railway-cutting near Inch Road Station.—*H. cupressiforme* L. In addition to the typical plant, the varieties *resupinatum* Schimp., *filiforme* Brid., and *ericetorum* B.& S. are common.—Var. *elatum* B. & S. On Portaw Hill.—*H. Patientiæ* Lindb. Roadside at Burt ; Trillick Banks. — *H. molluscum* Hedw. —*H. eugyrium* Schimp. Castleross River. — *H. ochraceum* Turn. Bog streamlet one mile east of Buncrana.—*H. scorpioides* L. Bog on Fahan Hill.—*H. stramineum* Dicks. Bogs about Bridge End.— *H. cordifolium* Hedw. Wet ground between Bridge End and Galliagh. — *H. giganteum* Schimp. Marsh at foot of Carradoan Wood. — *H. sarmentosum* Wahl. Abundant on Grianan Hill at about 500 ft. altitude. Hill behind Rushfield, near Buncrana.— *H. cuspidatum* L.—*H. Schreberi* Willd.

Hylocomium splendens B. & S.—*H. brevirostre* B. & S. Common. Like many other subalpines, this descends to sea-level ; at Ned's Point, Buncrana, and elsewhere.—*H. loreum* B. & S.—*H. squarrosum* B. & S.—*H. triquetrum* B. & S.

NEHEMIAH GREW AND HIS 'ANATOMY.'

[The *Journal of the Royal Microscopical Society* for April publishes the interesting presidential address delivered by Mr. Carruthers at the Annual Meeting of the Society on January 15th. Mr. Carruthers took for his subject Nehemiah Grew, and in the course of his paper demonstrated the injustice of the "attempts that have been made to depreciate the work of Grew, and to rob him of the credit that belongs to him as an original investigator." Having set forth in detail the separate works of Grew, Mr. Carruthers proceeds as follows :—]

Schleiden promulgated these charges in his *Grundzüge*, 1845. They are thus expressed by Lankester in his translation of Schleiden's work published in London, 1849, under the title of *Principles of Scientific Botany* (pp. 37, 38) :—

"Marcello Malpighi, professor at Bologna, gave a more accurate account of the structure of plants [than Hooke]. He sent to the Royal Society of London his great work, *Anatome Plantarum*, in the year 1670, which was published in two volumes, folio, at the expense of the Society, in 1675 and 1679. This work claims for him the title of the creator of scientific botany. He is so accurate, and pursues so correct a method, that it was a century before [*i. e.* in advance of] the time at which he wrote it, and at the present day many so-called botanists do not know so much of plants as Malpighi. He not only observed the cellular structure of plants, but maintained that it was composed of separate cells, which he called *Utriculi*. Nehemiah Grew was Secretary to the Royal Society at the time Malpighi's work was publishing. He published his *Anatomy of Plants* in 1682; is much indebted to Malpighi. He first took up the wrong view that the walls of the cells are composed of fibres; he also, by comparing the cells of plants to the froth of beer, would appear to have thought that they were mere cavities in a homogeneous substance, a view which was afterwards supported by C. Fr. Wolff."

The assertions of Schleiden are based upon dates, but they are erroneous dates. Malpighi's preliminary discourse, which occupies the first fifteen pages of his *Anatome*, has inscribed on the last page, "Dabam Bononiæ Calendis Novemb. 1671." It could not have been sent to the Royal Society in 1670. The first part of his *Anatome Plantarum* was sent by Malpighi in August, 1674, but did not reach the Secretary of the Royal Society till the 28th January, 1675; it was published the same year in one volume. Grew was elected Secretary in 1677, and had nothing to do with the publication of this earlier part of Malpighi's work. The second part of the *Anatome Plantarum* (the second of Schleiden's two volumes) reached the Society in 1679, and was published in the same year. No doubt Grew, who was still Secretary, took care of it through the press. But this part deals with the germination of seeds, galls, and roots of plants. Grew has said nothing about galls. His completed observations on germination were published in 1672,

and those on roots in 1673. Grew could not have been indebted to Malpighi for any help in these subjects. Schleiden makes his position apparently strong by asserting that Grew's work was not published till 1682, and this he does in face of the fact that the memoirs which occupy 140 pages out of 212 have on each title-page in bold letters "The Second Edition." And still further Schleiden blunders. Grew had noticed the unrolling of spiral vessels, and figures them in the leaves, and naturally, though erroneously, interpreted this appearance as due to their being composed of spiral fibres; but this is very different from the statement "that the walls of the *cells* were composed of fibres." And it is difficult to understand the consistency of Schleiden when he proceeds in the same sentence to say, "he also by comparing the cells of plants to the froth of beer would appear to have thought that they were mere cavities in a homogeneous substance." The two interpretations of the structure of the vegetable cell could not be entertained by any sane man; they certainly were not entertained by Grew.

One regrets to find that Sachs, in his *History of Botany* (translated by Garnsey and Balfour, 1890), repeats the charges, though in a somewhat modified form. He says: "The question to which of the two [Malpighi and Grew] the priority belongs has been repeatedly discussed, though the facts to be considered are undoubted. The first part of Malpighi's large work, the *Anatomes Plantarum Idea*, which appeared at a later time, is dated Bologna, November 1, 1671; and Grew, who from 1677 was Secretary to the Royal Society, informs us in the preface to his anatomical work of 1682 that Malpighi laid his work before the Society on December 7, 1671, the same day on which Grew presented his treatise, *The Anatomy of Plants Begun*, in print, having already tendered it in manuscript on the 11th May in the same year. But it must be observed that these are not the dates of the larger works of these two men, but only of the preliminary communications, in which they give a brief summary of the researches they had then made; the fuller and more complete treatises appeared afterwards; the preliminary communications formed the first part of the later works, and to some extent the introduction to them. The first part of Malpighi's longer account was laid before the Society in 1674, while Grew produced a series of essays on different parts of vegetable anatomy between 1672 and 1682; and these appeared together with his first communication in a large folio volume, under the title *The Anatomie of Plants*, in 1682. Thus Grew had opportunity to use Malpighi's ideas in his later compositions; he actually did so, and the important point as regards the question of priority is, that where he makes use of Malpighi he distinctly quotes from him. No more is necessary to remove the serious imputation which Schleiden has made against Grew" (p. 231).

Sachs' modified charge is also based on erroneous dates. He was unaware that the larger portion of Grew's *Anatomy of Plants* was published in 1672, 1673, and 1675, the latter year being the date of the reception and publication of Malpighi's *Anatome*. I have been able to discover only a single reference to Malpighi in Grew's

Anatomy of Plants, and there (p. 73) he quotes, as Sachs says, the words of the *Anatome*, but for the purpose of correcting and adding to Malpighi's statement.

The fact is that Grew and Malpighi were original investigators of plant anatomy. A comparison of their published works on this subject shows that throughout they are entirely independent, frequently differing in their interpretations, and often complimentary to each other. Grew was first in the field. Both men were no doubt moved with a common purpose expressed thus by Grew, "that the same subject, being prosecuted by two hands, would be the more illustrated by the different examples produced by both; and that the defects of both would mutually be supplied. And this was the opinion of the men of that day, for in a notice of Grew's "Anatomy of Trunks" in the *Philosophical Transactions*, No. 120, December 27, 1675, the writer says: "As there hath been a very happy concurrence of these two eminently learned persons, Signor Malpighi and our present author Dr. Grew, both Fellows of the R. Society, in making and exhibiting their ingenious and accurate beginnings concerning the anatomy of Plants, and thereby giving a new country of philosophy; so they have both been very industrious in pursuing this subject, in many things confirming one another's observations, and in some few ones supplying one another's defects." It is abundantly evident from the letters of Malpighi, Oldenburg, and Grew, that the most cordial relations existed between Malpighi and Grew. The following letter, preserved among the manuscripts of the Royal Society, which has not been published, is an interesting confirmation of this, as well as a specimen of the quaint courtesy of these olden times:—

"Most illustrious Sir,

"Since you have given me manifold occasion for writing to you, and the illustrious Mr. Oldenburgh has shown me a way of sending a letter, I could not (without sacrificing all good manners) any longer restrain my pen. And indeed I did not consider it unsuitable that you should learn from me as well as from others how worthy of praise are your writings dedicated to our Royal Society; from me, I say, who have myself benefited from them, and am truly proud so to have benefited. Moreover it is not at all fitting to recall the great candour with which it pleased you to notice my work, without expressing the gratitude and honour that is in my mind.

"I find that all your observations fully agree with mine: some however on the flower, the fruit, and the seed, it has pleased you to pass over. Of the wide tubes, which you call tracheæ, I first learned the spiral formation from your works, from which I seized the opportunity of adding also a few observations on the conformation of the said tubes.

"The anatomical observations which I collected concerning roots in the year just closed, together with the figures, some the natural size of the roots, others microscopical, I shall shortly (by the advice of the Royal Society) send to the printer. To these I have added the functions of the parts, and in individual cases the

methods of nutrition and configuration; the magnitude of the whole root, the causes of the figures, movements, ages, contents, briefly elucidated. To which also I determined to prefix the Idea of Phytological Science as it was delineated in my mind; and at the same time that they are published, to submit them to your learned and kind perusal. I saw also with the greatest pleasure your descriptions of the incubating ovum, both former and recent; the rest are all such accurate and graceful specimens of the same skill, learning and talent, that they plainly declare their Malpighian origin. Proceed, most learned Sir, in the things you have so excellently begun, and strive to bind us and posterity more each day to your honourable memory.

"Your most affectionate

"London, 5th March, 1672." "NEHEMIAH GREW.

SHORT NOTES.

"EAST SUSSEX NOTES."—In these "Notes" (p. 103), I spoke of "*the late* Rev. F. H. Arnold's 'Flora' of the county." A letter received this morning from the Rev. E. S. Marshall points out that, happily, this is a mistake, and that Dr. Arnold is still actively engaged in botanical work. I beg to apologise to Dr. Arnold for the inadvertency, which originated in a statement made to me a year or two ago by a usually well-informed friend.—WILLIAM WHITWELL.

RADICULA Hill. — Taking 1753 as the starting-point for generic names, a number of them must be dated from Hill's *British Herbal*, 1756. Among these *Radicula* must supersede *Rorippa* Scop., a name we had been reluctantly obliged to accept in place of the familiar *Nasturtium* "R. Br." Hill described (p. 265) and figured two species—1. *Radicula foliis pinnatifidis* (= *Nasturtium palustre*). 2. *Radicula foliis serratis* (= *N. amphibium*). The names of the four British species will apparently stand as follows:—

1. RADICULA OFFICINALIS.
   Rorippa nasturtium Beck v. Mannagetta, *Flor. Nieder-Oesterr.* ii. (1892), p. 463.
   Nasturtium officinale Aiton fil. *Hortus Kewensis*, ed. 2, iv. (1812), p. 110.
2. RADICULA PINNATA Moench, *Methodus* (1794), p. 263.
   Rorippa sylvestris Besser, *Enum. Plant. Volhyn.* (1822), p. 27.
   Nasturtium sylvestre Ait. f. *l. c.*
3. RADICULA PALUSTRIS Moench, *l. c.*
   Rorippa palustris Besser, *l. c.*
   Nasturtium terrestre Ait. f. *l. c.*
   ,, *palustre* DC. *Reg. Veg. Syst. Nat.* ii. (1821), p. 191.
4. RADICULA LANCIFOLIA Moench, *l. c.*
   Rorippa amphibia Besser, *l. c.*
   Nasturtium amphibium Ait. f. *l. c.*

H. & J. GROVES.

Distribution of British Rubi: a Correction. — I find, to my great regret, that I have made an unaccountable mistake at the beginning of the Rubi list on p. 150 of this year's Journal. The county of Edinburgh is there represented as having *no* Rubus forms except *idæus* "clearly known" for it; whereas it ought to have been credited with *three*—viz. *R. latifolius*, *R. saxatilis*, and *R. Chamæmorus*, long ago reported by Prof. Balfour. West Sutherland should also have been credited with five forms "clearly known," instead of four. I hope, though I hardly dare expect, that there are no further errors in the several lists, the compilation of which was laborious and often far from easy. But I shall be glad if the quickened energies of our younger field-botanists make them quite out of date within the next few years.—W. Moyle Rogers.

NOTICES OF BOOKS.

On the Relation of Phyllotaxis to Mechanical Laws. By Arthur H. Church, M.A., D.Sc. Part i. Construction by Orthogonal Trajectories, pp. 78 (September, 1901); 3s. 6d. Part ii. Asymmetry and Symmetry, pp. 79–211 (January, 1902); 5s. Williams & Norgate.

This work is to be continued, and when finished will doubtless receive an extended notice; at present it may be sufficient to explain the scope of these two parts. In the introduction an historical statement is extracted from Daubeny's *Lectures on Roman Husbandry*, 1857, p. 152, that by the oldest botanists the arrangement of leaves in series which formed alternating rows, when viewed horizontally or vertically, was aptly described by the term "Quincuncial," from the analogy of the familiar method of planting vines in the vineyard. It appears that Bonnet originated in 1754 the spiral construction for the arrangement of leaves; he moreover claimed to have discovered the "final cause" in the principle that "the transpiration which takes place in the leaves demands that air should circulate freely around them, and that they should overlap as little as possible."

In the general observations, page 22, the author says: "Phyllotaxis is the obvious and visible expression of more obscure phenomena in the growing apex, and must be referred *to the first Zone of Growth*, since in passing through the Zone of Elongation it may be fundamentally altered in appearance. . . . . It follows again that, for any spiral leaf arrangement that has passed through this second zone of elongation, no expression which is not a purely arbitrary and conventional one can be formulated."

Reference is made (page 31) to Sachs's theory of the orthogonal intersection of cell-walls, and to the remarkable similarity of the shape of the growing apex of a plant to a paraboloid of revolution, so that in a radial longitudinal section of a typical apex the periclinal walls form a series of confocal parabolas crossed by a

coaxial system of confocal parabolas which form the anticlinal walls. The author urges that the paraboloid shape of the plant-apex is incapable of proof, and that a construction founded on this principle does not satisfy the evidence deduced from Sachs's drawings; he prefers the proposition (page 42) "that the genetic spiral is a logarithmic spiral, homologous with the line of current-flow in a spiral-vortex, and that in such a system the action of orthogonal forces will be mapped out by other orthogonally intersecting log. spirals,—the 'parastichics.'"

The application of spiral-vortex construction is then arranged, followed by a demonstration that helices and spirals of Archimedes do not satisfy the requirements of ontogenetic observation. The latter portion of the first part contains a consideration of "ideal angles," all of which follow from summation-series expressing values of continued fractions of the type,

$$\cfrac{1}{x+\cfrac{1}{1+\cfrac{1}{1+1}}}, \text{ etc.},$$

where x may be any whole or fractional number.

The second part deals with asymmetrical and symmetrical phyllotaxis, and discusses—I. Normal Fibonaci phyllotaxis. II. Constant phyllotaxis. III. Rising phyllotaxis. IV. The symmetrical concentrated type. V. Asymmetrical least-concentrated type. VI. Symmetrical non-concentrated type. VII. Multijugal types. VIII. Anomalous series.

W. P. Hiern.

Manual of the Flora of the Northern States and Canada. By Nathaniel Lord Britton, Ph.D. New York: Henry Holt & Co. 8vo, cloth, pp. 1080.

In this well printed volume, Dr. Britton has supplied what we are sure must have been "a long felt want" among American botanists. The manuals of Asa Gray and Chapman for the Northern and Southern States respectively were excellent books, and have been of incalculable value in the past; but it was high time for a book which should be for the field what the *Illustrated Flora* is for the study, and it is well that the two works should proceed from the same hand. The earlier work is indeed a necessary complement of the *Manual*, for the latter contains neither synonymy nor bibliographical information, not even the place of publication of the species being given; while, on the other hand, the *Manual* supplements the larger work, as it contains a number of species not to be found in the *Illustrated Flora*, a considerable number of them now first published. We think that, in the case of additions already published, a bibliographical reference should have been added.

The arrangement follows that of the *Illustrated Flora*, which in its turn follows Engler & Prantl's *Pflanzenfamilien;* the nomenclature follows the rules of what is known as the "Rochester Code," the

instability of which is once more demonstrated in a severely critical article by Mr. M. L. Fernald, published in the *Botanical Gazette* for last November, to which, if space permit, we propose to return.

A few points of detail seem to us open to criticism. What are absurdly called "English names" are given—not for "each species," as stated in the preface, but for most of them; sometimes these are Latin, *tout court*, as *Brachyelytrum*, but in most instances they are translations of adaptations—what claims have "Filiform Muhlenbergia" or "American Korycarpus" to be called "English names"? There are two indexes, one of Latin and one of "English" names, the former being limited to genera; these should have been combined as a matter of convenience: at present many names—*e.g.* the two mentioned above—though printed in the text as "English," are found only in the Latin index. It would be well in future to print the name of the genus at the head of each page, though this is rendered less necessary by the repetition of the name in full in connection with each species. We regret that the author should sanction the abbreviation of his name in a manner which may cause confusion: "Britt. & Holl."—the authorities cited for a species of *Lechea*—stands for "Britten and Holland" equally with "Britton and Hollick." But these are small matters: the book is a welcome addition to botanical literature, and must take rank as the standard manual of North American botany.

J. B.

Elementary Plant Physiology. By Daniel Trembly Macdougal, Ph.D., Director of the Laboratories, New York Botanical Garden. 8vo, pp. xi, 138, tt. 108. New York: Longmans, &c. 1902. Price 3s.

Dr. Macdougal, whose *Practical Textbook of Plant Physiology* we noticed in this Journal for October of last year, has prepared the present volume to meet the demands for a more elementary course of demonstrations which may be followed by beginners in the subject. To render the book as widely useful as possible, only the simpler methods of experimentation are employed. The experiments are arranged under the headings—Growth; Reproduction and Germination; Exchange and Movements of Gases and Liquids; Nutrition; Respiration, Digestion, and Fermentation; and Stimulation and Correlation. Selected courses are suggested suited to the varied requirements of schools, according to the time available for work. The volume forms a useful introduction to the practical study of the life processes of plants; illustrations are plentiful, and will often be found useful in arranging the apparatus for the experiments.

A. B. R.

BOOK-NOTES, NEWS, &c.

At the meeting of the Linnean Society on March 20th, Prof. J. C. Bose read a paper on "Electric Response in ordinary plants under mechanical stimulus." He first explained his apparatus and methods, and then performed a series of experiments showing electric response for certain portions of the plant organism, which proved that as concerning fatigue, behaviour at high and low temperatures, the effects produced by poisons and anæsthetics, the responses are identical with those hitherto held to be characteristic of muscle and nerve and of the sensitive plants. He drew the conclusion that the underlying phenomena of life are the same in both animals and plants, and that the electrical responses which he had demonstrated are but the common physiological expression of these. Dr. O. Stapf read a paper on the fruits of *Melocanna bambusoides* Trin., an endospermless viviparous genus of *Gramineæ*. They are of the shape and size of small apples or inverted pears, usually terminating with a short and long beak; the longest measuring as much as five inches in length. They consist of a hard, thick, fleshy pericarp, which contains a great deal of starch stored in a parenchymatic tissue, of a testa developed as nutrient layer and present in the mature fruit in an "obliterated" condition, and an embryo possessing an enormous ellipsoid scutellum which fills up the large central cavity of the pericarp, or is partly empty. The epidermis of the scutellum is developed as haustorial epithelium of the kind characteristic of grass-seeds, so far as it is in contact with the pericarp or, rather, the nutrient layer. It is traversed by numerous vascular strands which start from a plate of tangled strands in the axis of the embryo, and send out innumerable branchlets near the surface of the scutellum. The fundamental tissue in which the strands are embedded is delicately-walled parenchyma, full of starch. There is no endosperm. Germination starts while the fruits are still on the tree, and the young shoots may attain a length of as much as six inches, whilst a bundle of roots is formed simultaneously. During germination the scutellum acts on the pericarp as it acts in typical grasses on the endosperm, depleting not only the store of starch and other nutrient matter deposited in the cells of the parenchyma, but finally inducing also the partial solution of the cell-walls. This structure of the fruit of *Melocanna* is almost unique in grasses, and was not known before. It is probably repeated, although with some modifications, in the genera *Melocalamus* and *Ochlandra*.

At the meeting of the same Society on April 3, Mr. R. Morton Middleton read translations of two unpublished letters from Linnæus. The first, to Richard Warner, of Woodford, was written from Upsala, September 29, 1758, and enclosed by Linnæus in a letter to John Ellis. There is a reference to it in the letter to Ellis, printed in Sir J. E. Smith's *Correspondence of Linnæus*. This letter deals with *Gardenia florida*, which had been sent by Warner to Linnæus, who was urged by Ellis to name the genus *Warneria;*

Warner, however, declined the compliment. Ellis then proposed *Augusta*, but Linnæus objected to adopt an adjective as a generic name. Ellis finally proposed *Gardenia*, in honour of Dr. Alexander Garden, a correspondent of Linnæus, and this was adopted. The letter concludes:—"I have for a long time heard a great deal of your industry in collecting and cultivating very rare plants, and your unwearied studies of the same, so that nothing will give me greater pleasure than to cherish, for your sake, this plant, which the botanic world owes to you." The second letter, from Upsala, April 18, 1769, is to Van Royen, "the very famous Professor of Botany," at Leyden, acknowledging the gift of some seeds. There was also sent "a leaf from Mexico, which is, unless I am greatly mistaken, the nut-bearing tree, with leaves like maidenhair (*foliis adiantinis*), of a genus which even now is wholly unknown. I should be glad if you could give the botanical world a full description of this plant." Linnæus adds a reference to Kaempfer's *Amoenitates*, where there is a figure, and a line and a half of description—the first published of the Gingko tree.

Mr. R. A. Rolfe, on behalf of the Director, Royal Gardens, Kew, exhibited a series of specimens of *Pachira aquatica* Aubl. and *P. insignis* Savigny, from British Guiana, collected by the late G. S. Jenman, to illustrate the great variation which exists in the size and shape of the fruits. It appeared that the two species were best distinguished by their flowers, those of *P. insignis* being very large and having broad crimson petals of considerable substance, while those of *P. aquatica* were smaller and, the petals light yellow, narrower, and of more slender texture. No distinguishing character had been detected in the fruit, which, though varying greatly in size and shape, seemed almost to duplicate itself in the characteristic forms of the two species. In both, the shape varies from fusiform-oblong and considerably elongated to shortly elliptical, with a series of intermediate forms. There was also a certain amount of variation in the leaves and flowers, though in the latter each species retained its own essential character. These trees were common over the great alluvial forest-region, extending also to Brazil, and were commonly cultivated for ornament. Mr. Rolfe also exhibited some specimens illustrating the precocious germination of the seeds of a species of *Dracæna*. Germination had taken place through the pericarp while the berries were still hanging on the plant.

At the same meeting Mr. Spencer Moore read a paper entitled "A Contribution to the Composite Flora of Africa," in which he described a number of new species in the Herbarium of the British Museum. He found that the north-eastern tropics, especially British East Africa and the neighbouring parts of Somaliland and Southern Abyssinia, had yielded most of the novelties, the chief collectors having been Mr. Scott Elliot, Prof. Gregory, Mr. F. J. Jackson, Lord Delamere, Dr. S. E. Hinde, Mrs. Lort Phillips, Dr. Donaldson Smith, Rev. W. E. Taylor, of Mombasa, and Prof. Mackinder. From the southern tropics he described some plants collected by the late Mr. John Buchanan, by Mr. Crawshay, and

Mr. T. G. Een. A new Gnaphaloid genus (*Artemisiopsis*) was characterized, and, among others, species of *Vernonia*, *Erlangea*, *Helichrysum*, *Coreopsis*, and *Senecio*.

Prof. F. E. Weiss on the same occasion gave an account, illustrated by lantern-slides, of a biseriate Halonial branch of *Lepidophloios fuliginosus*. The branch in question, about seven inches in length, was found in a large nodule by Mr. George Wilde at Haugh Hill, near Stalybridge. Dr. Scott, in a preliminary communication to the British Association in 1898, had identified it with the plant described by Williamson as *Lepidodendron fuliginosum*, now generally included in the genus *Lepidophloios*. Prof. Weiss supported this identification, and brought forward several instances of halonial branches of *Lepidophloios* which possessed only two rows of tubercles, instead of the more usual quincuncial arrangement of the tubercles. The specimen referred to, of which photographs were shown, were from the British and Manchester Museums, and instances were also cited from Williamson's published memoirs. The second part of the paper consisted of a detailed account of the anatomy of this well-preserved specimen, which went to confirm Dr. Scott's previous identification. The parts chiefly referred to in this account were the secondary tissue, consisting apparently exclusively of parenchymatous cells, and the well-preserved middle cortex, the continuation of which into the parichnos strand of the leaf-traces was most clearly illustrated from a longitudinal section lent by Dr. Scott. The occurrence of a meristematic tissue apparently in the position of the pericycle was referred to, and compared with the cambium of *Isoëtes*. Though the phloem elements of the main axis were not well preserved, Prof. Weiss stated that the better preserved tissues of this region in the lateral tubercles confirmed the view he had taken of the phloem of *Lepidophloios*.

The part (vol. viii. pt. 3) of the *Flora of Tropical Africa* issued last month is almost entirely occupied by the completion of Mr. C. B. Clarke's monograph of the *Cyperaceæ*. The editor contributes to the volume now completed a short preface, from which we are glad to learn that the printing of the fourth volume will at once be proceeded with. "This will contain the *Apocynaceæ*, the final elaboration of which has been delayed till the present in order to enumerate and describe as comprehensively as possible the important caoutchouc-containing and medicinal plants which the order includes in Tropical Africa." The paper read by Sir W. Thiselton- (then Mr. W. T. T.) Dyer before the Linnean Society in 1882 upon these plants has not, yet, we believe, been published, although we understand plates for it were prepared; it will doubtless be incorporated in the "final elaboration" which it is gratifying to know has been at length achieved. The brief appendix contains the addition of the order *Mayaceæ*, one representative of which—*Mayaca Baumii* Gürke—has lately been found in Angola, and some new species, the position of which is indicated by the number prefixed to each. We would suggest in the interests of convenience that in addition to this the page where the insertion should be made should in

future always be indicated. At the end is a correction relating to vol. v., which is so likely to be overlooked that we reprint it here: "*Premna longipes* Baker in Fl. Trop. Afr. v. 288 is a synonym of *Hoslundia opposita* Vahl." We note that Mr. Scott Elliot's name is throughout embellished with a hyphen, which we believe he has not yet assumed.

The British Mycological Society have just issued the concluding part of the first volume of its *Transactions*. The Society was founded in 1896, and has done good service in reviving and maintaining an interest in the study of Fungi. The annual week's Fungus-foray was held at Exeter, and resulted in a list of about 400 specimens, two of which were new to the British flora—*Femsjonia luteoalba* and *Helminthosporium obclavatum*. The President's address was a valuable exposition of laboratory methods in the examination and culture of Fungi. Dr. Plowright publishes a note on a much debated fungus, *Ozonium auricomum*, which he found associated with *Coprinus domesticus*. Mr. B. T. P. Barker, Cambridge, contributes a paper on spore-formation in *Saccharomycetes*. Two papers read at the Exeter meeting and published in other journals are reprinted in the *Transactions*. The one by Prof. Marshall Ward on "The Bromes and their Rust-fungus" appeared in the *Annals of Botany* for September; the other by Miss A. Lorrain Smith, on "The Fungi of Germinating Farm-seeds," was published in December in the *Journal of the Royal Microscopical Society*. A list of Fungi new to Britain is also given, and there is a full and careful index. The Society owes much to the Hon. Secretary and Editor, Mr. Carleton Rea, of Worcester. Professor James W. H. Trail, of Aberdeen, has been elected the President for the ensuing year, and the foray will take place in the autumn at Hereford, in connection with the Woolhope Club.

Mr. C. G. Lloyd, of Cincinnati, has published a short account of *The Genera of Gastromycetes*. He begins with a description of the minute structure; a classified table of the genera follows, and illustrations of a member of each genus. He gives some good notes on the generic value of capillitium, sterile base, and form of spores. The paper should form a useful introduction to the study of the group. Mr. Lloyd's constant omission of authorities leaves one in the dark as to the origin of the plants, and he does not indicate in what countries the different genera may be looked for.

Professor Potter, of the College of Science, Newcastle, has described in the *Transactions* of the English Arboricultural Society a canker of oaks caused by a *Stereum*. The affected oaks are, he says, not uncommon in the North of England. By means of cultures and the infection of healthy trees he was able to satisfy himself as to the origin of the disease. Professor Potter considers that he is dealing with a *Stereum* hitherto undescribed, and has named it *S. quercinum*.

Mr. James E. Whiting publishes "Some Notes on the Flora of Hampstead" in the *Hampstead Annual* for 1901; a popular account of the present condition of the flora of the Heath and neighbourhood.

Judging from the *Report of the Felsted School Scientific Society* for 1900–1901, botany is not a popular study at the present time. The Rev. E. Gepp contributes a short "botanical report" which contains a curious mixture of type and some interesting notes on certain plants occurring in that part of Essex; but why, in a publication issuing from an educational centre, are the Latin names deprived of their capitals?

The Scottish Geographical Magazine for March contains an interesting paper on "A Botanical Survey of Scotland," by Dr. W. G. Smith, of the Yorkshire College, Leeds. It is based on the work of his brother, the late Robert Smith; we hope to give some extracts later, if space will allow.

Messrs. Blackie & Son contemplate a re-issue of Prof. F. W. Oliver's translation of *Kerner's Natural History of Plants*. The new edition will be issued at a considerably reduced price; it will be substantially a reprint, with a few necessary alterations and corrections.

Mr. Lister Petty publishes in the *Naturalist* for February what appears to be a very complete list of the plants of Silverdale, West Lancashire.

The Bureau of Plant Industry of the U.S. Department of Agriculture has issued a bulletin of exceptional botanical interest. Under the title "Spermatogenesis and Fecundation of *Zamia*," Mr. H. J. Webber, physiologist to the Department, gives an exhaustive account of his work on the sexual stage in the life-history of this genus of Cycads. As the results achieved in this direction have previously been published, there is no need to give an abstract. Botanists will be glad to have in one pamphlet this connected account, to which the bibliography forms a useful appendix.

In vol. xlvi. of the *Manchester Memoirs*, No. 9 (March, 1902), Prof. F. E. Weiss discusses the affinity of *Xenophyton radiculosum*. Williamson suggested that it was of the nature of a *Stigmaria*; but Hick, by whom it was described, was not able to adopt this view. The author of the present paper is strongly of Williamson's opinion, which is supported by the general appearance of the fossil with quincuncially arranged rootlets, the character of the stele with centrifugal xylem and broad medullary rays, the structure of the rootlet-cushions and also of the rootlets, which are numerous and otherwise similar to stigmarian rootlets. The most striking differences consist in the presence of a well-preserved pith and the small development of secondary wood. The former can scarcely be considered a character of generic importance; and the latter, if shared with the stem to which it belonged, would suggest that in *Xenophyton* we have the "root" or rhizophore-like structure of some *Lepidophloios*. The massive middle cortex of the fossil further points to *L. juliginosus* as the corresponding stem; and the author concludes that the two fossils were thus associated.

We regret to announce the death of Mr. Thomas Comber, which took place suddenly at Blackpool on Jan. 24; and of Mr. G. S. Jenman, Government Botanist of British Guiana, who died at Georgetown on Feb. 28. Notices of these botanists will appear later.

Suffolk (Felixstowe), Norfolk (Yarmouth, Cromer), Yorkshire (Scarborough, Whitby, Filey), Durham (Sunderland), and Northumberland (Holy Island, Bamborough, Berwick); Wales (Hilbre Island, Puffin Island, Anglesea, &c.); Scotland (Dunbar, Elie, Fife; Aberdeen, Peterhead, Orkney Islands, Oban, Cumbrae, Arran, &c.); Ireland (Bantry Bay, Cork, Howth, Portaferry, Belfast Lough, Roundstone Bay, Kilkee, &c.); Channel Islands. Common and abundant on the shores of the British Islands. — *β distorta* Harv. On submarine peat at Birturbui Bay, Connemara. — *γ nuda* Holm. & Batt. (= *C. nuda* Harv.). Port Stewart, Co. Antrim.

C. hirta Kütz. (= *Conferva flexuosa* Dillw., non Eng. Bot.). Coasts of Cornwall (Falmouth), Devon (Sidmouth), Dorset (Weymouth), Sussex (Bognor), Suffolk (Felixstowe), and Northumberland (Berwick). Not uncommon.

C. utriculosa Kütz. (= *C. lætevirens* Harv. partim). Coasts of Cornwall (Plymouth, Scilly Islands), Devon (Torquay, Sidmouth), Dorset (Weymouth), Sussex (Bognor, Worthing), and Hants (Ventnor, Isle of Wight); Isle of Man; Wales (Puffin Island, Anglesea); Scotland (Cumbrae, Loch Etive). Not uncommon. — *β diffusa* Hauck. Coasts of Sussex (Bognor) and Norfolk (Yarmouth, Cromer).

C. trichocoma Kütz. Coast of Sussex (Bognor); Scotland (Cumbrae); Ireland (Kilkee). Rare.

C. gracilis Kütz. Coasts of Cornwall (Mount's Bay, Falmouth, Looe), Devon (Torquay, Plymouth), Dorset (Weymouth, Studland), Hants (Isle of Wight), Sussex (Brighton), Norfolk (Cromer), and Northumberland (near Hartley); Scotland (Peterhead, Ballantrae, Cumbrae, Fairlie, Ardrossan, Orkney Islands); Ireland (Youghal, Cork Harbour, Wicklow, Belfast Lough). Not common.—*β tenuis* Thur. Coast of Dorset (Weymouth, Studland). Rare.

C. sericea Kütz. (= *Conferva lætevirens* Dillw. and *Cladophora crystallina* Kütz.). Coasts of Cornwall (Mount's Bay, Falmouth, Looe, Fowey, St. Minver), Devon (Plymouth, Torquay, Sidmouth), Dorset (Weymouth, Swanage), Hants (Ventnor, Isle of Wight), Sussex (Bognor, Worthing, Brighton, Pagham), Kent (Deal), Norfolk (Cromer), Yorkshire (Scarborough, Filey), and Northumberland (Cullercoats, Alnmouth, Holy Island, Berwick); Wales (Hilbre Island, Swansea); Scotland (Dunbar; Elie, Fife; Arbroath, Girdleness, Peterhead, Orkney Islands, Loch Etive, Cumbrae); Ireland (Bantry Bay, Cork, Antrim coast, Roundstone Bay, &c.); Channel Islands. Common.

C. glaucescens Harv. Coasts of Cornwall (Mount's Bay, Falmouth, Looe), Devon (Torquay, Plymouth), Dorset (Weymouth), Sussex (Brighton), Essex (Harwich), Kent (Deal), Suffolk (Felixstowe), and Yorkshire (Scarborough); Wales (Hilbre Island, Puffin Island, Anglesea); Scotland (Elie, Fife; Aberdeen, Orkney Islands, Cumbrae, &c.); Ireland (Portmarnock, Mangan's Bay, Cork; coast of Down, Kingston); Channel Islands (Jersey). Not common.

C. flexuosa Harv. Coasts of Cornwall (Mount's Bay, Falmouth, Fowey), Devon (Plymouth, Torquay, Sidmouth), Dorset (Weymouth), Sussex (Brighton, Eastbourne), and Cheshire (Eastham);

Wales (Hilbre Island, Puffin Island, Anglesea); Scotland (Aberdeen, Montrose Ness); Ireland (Ballycastle, Antrim); Channel Islands (Guernsey, Alderney). Not uncommon.

C. refracta Aresch. (Harv. partim; non Kütz.). Coasts of Cornwall (Falmouth) and Devon (Torquay, Ilfracombe); Scotland (Skaill, Orkney Islands); Ireland (Kilkee). Probably not uncommon.

C. corymbifera Kütz. Coasts of Hants (Cowes, Isle of Wight) and Northumberland (Berwick). Rare.

C. albida Kütz. Coasts of Cornwall (Mount's Bay, Falmouth, Looe, St. Minver), Devon (Torquay, Bovisand, Dawlish), Dorset (Weymouth, Portland, Swanage), Sussex (Brighton), Hants (Cowes, Isle of Wight), Essex (Dovercourt), Suffolk (Felixstowe), Norfolk (Cromer), and Northumberland (Berwick); Wales (Puffin Island); Isle of Man; Scotland (Elie, Fife; Arbroath, Orkney Islands, Cumbrae, Arran); S. & W. Ireland (Bantry Bay, Cork Harbour, Roundstone Bay); Channel Islands. Not uncommon.—*β refracta* Thur. (= *Conferva refracta* Wyatt, Alg. Danm. no. 228; *Cladophora refracta* Harv. partim; *C. curvula* Kütz.). Coasts of Cornwall (Penzance, Mount's Bay, Falmouth, Fowey, Looe), Devon (Ilfracombe, Torquay), Sussex (Brighton, Bognor), and Norfolk (Cromer); Wales (Puffin Island, Anglesea); Isle of Man; Scotland (Dunbar; Elie, Fife; Orkney Islands, Cumbrae, Saltcoats); Ireland (Kilkee, Dingle, Cork Harbour, Dunlecky Castle, Howth, Balbriggan, Giant's Causeway); Channel Islands. Not uncommon.

C. Balliana Harv. E. coast of Ireland (Clontarf, Portaferry); S.W. Scotland (Ailsa Craig, Cumbrae); N.W. England (Puffin Island). Rare.

C. Rudolphiana Harv. Coasts of Cornwall (Falmouth) and Northumberland (Holy Island, Berwick); Scotland (Cumbrae); Ireland (Roundstone Bay, Connemara). Abundant at Roundstone; very rare elsewhere.

C. expansa Kütz. Coasts of Dorset (Weymouth) and Norfolk (Cley). Rare.

C. fracta Kütz. *α marina* Hauck. Coasts of Devon (Plymouth), Dorset (Lodmoor, near Weymouth; Poole), Hants (Southampton), Sussex (Brighton), Suffolk (Felixstowe), Norfolk (Yarmouth, Cley), Yorkshire (Scarborough), Durham (Sunderland, Ryhope, Seaton), and Northumberland (Fenham Flats); Wales (Anglesea); Scotland (Orkney Islands, Arran, Cumbrae, &c.); Ireland (Cork Harbour, Antrim coast, &c.); Channel Islands (Guernsey). Common.—*β flavescens* (= *C. flavescens* Harv., non Kütz.). Coasts of Dorset (Lodmoor, near Weymouth), Sussex (Lancing), Norfolk (Cromer, Cley), and Northumberland (Fenham Flats); Ireland (Co. Cork, &c.); Channel Islands (Guernsey). Not uncommon. — *γ patens* Holm. & Batt. (= *C. refracta* Holm. Alg. Br. Rar. Exsicc. no. 91, non Aresch.). Coast of Dorset (Lodmoor, near Weymouth). Rare. — *δ flexuosa* (= *Conferva flexuosa* Holm. Fasc. no. 56, non Dillw. nec Eng. Bot. nec Griff.). Coast of Norfolk (Cley). Rare.

C. Magdalenæ Harv. Coasts of Dorset (Weymouth, Portland), Hants (Freshwater, Isle of Wight), and Sussex (Pagham); Channel Islands (Jersey). **Rare.**

Subgenus 2. Ægagropila Kütz.

C. repens Kütz. Coasts of Dorset (Weymouth) and Northumberland (Spittal, near Berwick); Channel Islands (Jersey, Guernsey). Very rare.

C. Brownii Harv. Coast of Cornwall (Mousehole, Penzance); Ireland (Dunrea, Blackcastle, Wicklow). Very rare.

C. cornea Kütz. *β verticillata* Kütz. (= *C. retroflexa* Crn.), Coast of Dorset (Weymouth); Ireland (Roundstone Bay, Fahy Bay, Connemara). Very rare.

C. corynarthra Kütz. *β spinescens* Batt. Coast of Dorset (Weymouth); Ireland (Roundstone Bay, Connemara).

Subgenus 3. Spongomorpha Kütz. (= Acrosiphonia J. Ag. partim).

C. arcta Kütz. Coasts of Cornwall (Mount's Bay, St. Minver, Looe, Falmouth, Scilly Islands), Devon (Torquay, Plymouth, Sidmouth), Dorset (Swanage, Weymouth), Hants (Isle of Wight), Sussex (Bognor), Norfolk (Cromer), Yorkshire (Scarborough), Durham (Sunderland, &c.), and Northumberland (Holy Island, Berwick, &c.); Cheshire (Eastham, Bromborough); Isle of Man; Wales (Anglesea, Puffin Island); Scotland (Dunbar; Joppa, near Edinburgh; Elie, Fife; Orkney and Shetland Islands, Appin, Ardchattan, Cumbrae, Arran, &c.); Ireland (Bantry Bay, Cork Harbour, Antrim coast, &c.); Channel Islands. Not uncommon. — *β vaucheriæformis* Harv. Coasts of Dorset (Weymouth, Swanage) and Northumberland (Berwick); Scotland (Dunbar). Rather rare. — *γ radians* Batt. (= *C. radians* Kütz.). Coasts of Cornwall (Scilly Islands, Falmouth), Devon (Torquay), Dorset (Weymouth, Swanage), Yorkshire (Filey), and Northumberland (Berwick); Orkney Islands. Not uncommon. — *δ centralis* Harv. Coast of Devon (Torquay); Orkney Islands. Rare.

C. Traillii Batt. (= *Acrosiphonia Traillii* Batt.). Joppa, near Edinburgh. Very rare.

C. Sonderi Kütz. Coast of Dorset (Weymouth); Orkney Islands. Very rare.

C. arctiuscula Kütz. Coast of Northumberland (Berwick); Scotland (Dunbar, Joppa, Arbroath). Probably not uncommon.

C. stolonifera Batt. (= *Acrosiphonia stolonifera* Kjellm.). Coast of Northumberland (Berwick); S.W. Scotland (Cumbrae). Rare.

C. pallida Batt. (= *A. pallida* Kjellm.). Coast of Northumberland (Berwick); S.W. Scotland (Cumbrae).

C. uncialis Kütz. (incl. *C. congregata* Kütz.). Coasts of Cornwall (St. Michael's Mount, Falmouth, St. Minver), Devon (Wildersmouth, Torbay, Bovisand), Dorset (Swanage), Suffolk (Felixstowe, Harwich), and Northumberland (Berwick); Isle of Man; Wales (Puffin Island, Aberystwith, &c.); Scotland (Dunbar; Elie, Fife; Orkney Islands, Lismore); Ireland (Malahide, Kingstown, Balbriggan; Newcastle, Co. Down; Rathlin Island, Antrim).

C. bombycina Batt. (= *Acrosiphonia bombycina* Kjellm.; *C. lanosa* Harv. pro parte). Coasts of Devon (Torquay), Sussex (Bognor), and Northumberland (Berwick); Scotland (Orkney Islands, Bute). Not uncommon.

C. lanosa Kütz. Coasts of Cornwall (St. Minver, Falmouth, Looe), Devon (Torquay, Ilfracombe, Plymouth, Sidmouth), Sussex (Bognor, Brighton), Norfolk (Cromer), Kent (Dover), Yorkshire (Scarborough), Durham (Sunderland), and Northumberland (Holy Island, Berwick); Isle of Man; Wales (Puffin Island, Anglesea); Scotland (Dunbar; Elie, Fife; Orkney Islands, Forres, Lismore, Arran, Cumbrae, &c.); Ireland (Bantry Bay, &c.); Channel Islands. Not uncommon.—*β Zosteræ* (Dillw.). Coasts of Dorset (Weymouth) and Sussex (Bognor, Brighton, Worthing); Scotland (Forres). Rather rare.

Fam. Gomontiaceæ Born. & Flah.

Gen. 64. Gomontia Born. & Flah.

G. polyrhiza Born. & Flah. (Immersed in the chalky shells of several species of molluscs.) Coasts of Devon (Teignmouth, Torquay, Sidmouth, Plymouth), Dorset (Weymouth, Swanage), Norfolk (Cromer), and Northumberland (Berwick); Scotland (Dunbar, Cumbrae); Ireland (Belfast Lough). Not uncommon.

G. manxiana Chodat. Castletown, Isle of Man. Rare?

Suborder Siphoneæ Grev.

Fam. Phyllosiphonaceæ Frank.

Gen. 65. Ostreobium Born. & Flah.

O. Queketti Born. & Flah. Immersed in the chalky shells of various species of molluscs. Coasts of Devon (Plymouth, Sidmouth) and Northumberland (Berwick). Scotland: Bute (Isle of Cumbrae); Argyle (Loch Fyne); Dumbarton (Gare Loch). Not uncommon.

Fam. Hydrogastraceæ Rabenh. (*Botrydiaceæ* Rostaf. & Woron.).

Gen. 66. Halicystis Aresch.

H. ovalis Aresch. (*Valonia ovalis* Ag.). Scotland: Argyle (Loch Goil); Bute (Kyles of Bute, Isle of Arran). Ireland: Antrim (N. side of Belfast Lough); Co. Dublin (Dalky Sound); Co. Waterford (Helvick Point, Dungarvan Bay). Very rare, and only obtained by dredging.

Fam. Bryopsidaceæ Thur.

Gen. 67. Bryopsis Lamour.

B. hypnoides Lamour. Coasts of Cornwall (Scilly Islands, Mount's Bay, Falmouth, Fowey, Looe); Devon (Ilfracombe, Torquay); Dorset (Weymouth, Swanage, Studland); Sussex (Bognor); Cheshire (Hilbre Island). Scotland: Argyle (Appin); Ayr (Portincross, Seamill, Saltcoats); Kirkcudbright (Southerness); Haddington (Prestonpans). Ireland: Co. Galway (Roundstone); Co. Clare (Kilkee, Portrush). Channel Islands (Jersey, Guernsey, Alderney, Sark). Rather rare on the English and Scotch coasts; not uncommon on the W. coast of Ireland.

B. plumosa Ag. Coasts of Cornwall (St. Minver, Mount's Bay, Falmouth, Fowey, Looe); Devon (Plymouth, Exmouth, Torquay, &c.); Dorset (Swanage); Hants (Ventnor and Steephill, I. of W.) Sussex (Bognor, Brighton, Hastings); Kent (Folkestone); Essex

(Harwich); Suffolk (Felixstowe), Norfolk (Runton, Cromer); Yorks (Filey, Scarborough, Whitby); Durham (Seaton Carew, Hartlepool, Seaham Harbour); Northumberland (Cullercoats, Alnmouth, Holy Island, Berwick); Isle of Man. Wales: Anglesea (Puffin Island, Isle of Anglesea). Scotland: Berwicks. (Burnmouth, Eyemouth); Haddington (Dunbar, Longniddry, Prestonpans); Edinburgh (Joppa); Fife (Queensferry, Kirkcaldy, Largo, Elie, &c.); Kincardine (Cove); Aberdeen (Peterhead); Moray Firth; Orkney Islands; Argyle (Appin); Bute (Isles of Cumbrae and Arran); Ayr (Saltcoats, Girvan, &c.). Ireland, Channel Islands (Jersey, Guernsey, Alderney, Sark). Not uncommon.—*β subsimplex* Holm. & Batt. Coast of Devon (Ilfracombe, Torquay). Rare. — *γ nuda* Holmes, Alg. Br. Rar. Exsicc. no. 178. Coast of Dorset (Portland).

Gen. 68. Derbesia Solier.

D. tenuissima Crn. (= *Vaucheria marina* Harv.). Coasts of Devon (Torquay, Sidmouth, Salcombe) and Dorset (Swanage). Scotland: Argyle (Appin). Rare.

Fam. Vaucheriaceæ Dumort.

Gen. 69. Vaucheria DC.

V. dichotoma Lyngb. *β marina* Ag. Coast of Dorset (Weymouth). Scotland: Argyle (Appin). Rare.

V. Thuretii Woron. (= *V. velutina* Harv. partim). Coasts of Dorset (Weymouth) and Northumberland (Berwick). Scotland: Argyle (Appin); Bute (Brodick, Arran); Ayr (Largs). Probably not uncommon.

V. synandra Woron. Coast of Lancashire (near Ulverstone). Rare.

V. sphærospora Nordst. *α genuina* Nordst. f. *synoica* Nordst. Coast of Cornwall (Saltash). Scotland: Argyle (Appin, Ballachulish). Ireland (Cushendall, Co. Antrim). Rare.—f. *dioica* Rosenv. (= *V. velutina* Harv. partim et *V. piloboloides* Holmes, Alg. Br. Rar. Exsicc. no. 50, non Thur.). Coasts of Cornwall (Fowey, Saltash); Devon (Sidmouth); Essex (Maldon); Norfolk (Cley); Northumberland (Berwick). Scotland: Haddington (Dunbar); Orkney Islands; Bute (Isle of Cumbrae); Ayr (Seamill). Ireland (Cushendall, Co. Antrim). Not uncommon.

V. coronata Nordst. Coast of Forfar (Arbroath). Rare.

V. litorea Bang & Ag. Coasts of Dorset (Lodmoor, near Weymouth); Essex (Clacton); Lancs (Ulverstone). Wales: Merioneth (between Barmouth and Dolgelly); Carmarthen (Ferryside). Scotland (Inverness). Ireland N.E. Rather rare.

Fam. Spongodiaceæ Lamour.

Gen. 70. Codium Stackh.

C. adhærens Ag. Coasts of Cornwall (Land's End, Sennen Cove, Falmouth, Gerran's Bay, Gorran Haven, Fowey); Devon (Wembury, Torbay); Dorset (Durlston Head); Isle of Man (Port St. Mary). Ireland (Rathlin Island, Co. Antrim; Tory Island, Co. Donegal). Channel Islands (Jersey, Guernsey, Alderney). Rare.

C. amphibium Moore. Coasts of Cornwall (Falmouth); Isle of Man (Perwick Bay, Port St. Mary). Ireland (Roundstone, Co. Galway). Very rare.

C. tomentosum Stackh. Coasts of Cornwall (Padstow, Penzance, Scilly Islands, Falmouth, Gerran's Bay, Fowey, Looe); Devon (Ilfracombe, Plymouth, Dawlish, Exmouth, Sidmouth, Torquay); Dorset (Weymouth, Swanage); Hants (Steephill and W. Cowes, Isle of Wight); Yorkshire; Durham; Isle of Man. Scotland: Aberdeen (Peterhead); Orkney Islands; Bute (Isle of Cumbrae). Ireland: Bantry Bay, Co. Cork; Milltown Malbay, and Kilkee, Co. Clare, &c. Channel Islands (Jersey, Guernsey, Alderney, Sark). Not uncommon.

C. elongatum Ag. W. coast of Ireland (Kilkee, Co. Clare). Very rare.

C. Bursa Ag. Coasts of Cornwall and Devon (Stonehouse Pool, Torquay); Sussex (Brighton). Ireland (near Belfast). Channel Islands (Jersey). Very rare.

Order FUCOIDEÆ J. Ag.

Suborder Phæosporeæ Thur.

Fam. Desmarestiaceæ Thur.

Gen. 71. Desmarestia Lamour.

D. viridis Lamour. Coasts of Cornwall (St. Minver, Mount's Bay, Trefusis, Falmouth, Looe); Devon (Plymouth, Torbay, Budleigh Salterton, Sidmouth); Dorset (Weymouth); Sussex (Brighton); Norfolk (Yarmouth); Yorks (Filey, Scarborough, Whitby); Durham (Hartlepool); Northumberland (Cullercoats, Whitley, Alnmouth, Holy Island, Berwick); Isle of Man. Wales (Anglesea, Puffin Island). Scotland: Haddington (Dunbar, North Berwick); Edinburgh (Caroline Park); Fife (Seafield, Dysart, Elie, Earlsferry); Kincardine (Girdleness); Aberdeen; Moray Firth (Forres); Orkney Islands; Argyle (Ardchattan, Loch Etive, Dunoon); Bute (Isles of Arran and Cumbrae); Ayr (Saltcoats). Ireland (Bantry Bay, Co. Cork; Larne, Co. Antrim, &c., not uncommon). Channel Islands (Jersey, Guernsey). Not uncommon.

D. aculeata Lamour. Coasts of Cornwall (St. Minver, Padstow, Mount's Bay, Trefusis, Falmouth, Looe); Devon (Torbay, Teignmouth, Exmouth, Salcombe, Ilfracombe); Dorset (Weymouth, Portland, Swanage); Hants (Isle of Wight); Sussex (Bognor, Brighton); Kent (Folkestone, Dover, Deal); Norfolk (Yarmouth); Yorks (Scarborough, Whitby); Durham (Sunderland, &c.); Northumberland (Cullercoats, Alnmouth, Holy Island, Berwick); Isle of Man. Wales: Anglesea (Llanvælog, Llangwyfan, Puffin Island); Carnarvon (Swillies). Scotland: Berwicks. (Burnmouth); Haddington (Dunbar, North Berwick); Edinburgh (Joppa); Fife (Seafield, Kirkcaldy, Earlsferry, Elie); Forfar (Arbroath); Aberdeen; Moray Firth; Orkney Islands; Argyle (Oban, Appin, Loch Etive, Loch Fyne, Campbeltown); Dumbarton (Gare Loch); Bute (Isles of Arran, Cumbrae, and Bute); Ayr (Heads of Ayr, Fairlie). Ireland: Abundant all round the coast. Channel Islands (Jersey,

Guernsey, Alderney). Common. — *β inermis* Crn. Alg. Mar. Fin. 93; Florule, p. 170. Coast of Cornwall (St. Minver). Rare.

D. ligulata Lamour. Coasts of Cornwall (St. Minver, Mount's Bay, Lizard, Kynance Cove, Falmouth, Looe, Cawsand); Devon (Plymouth, Torquay, Exmouth, Sidmouth); Dorset (Weymouth, Portland, Swanage); Hants (Isle of Wight); Sussex (Brighton, Hastings); Kent (Folkestone, Dover, Deal); Suffolk (Corton); Norfolk (Yarmouth, Cromer); Yorks (Filey); Northumberland (Newbiggen, Alnmouth, Holy Island); Isle of Man. Wales: Anglesea (Llangwyfan, Llanvaelog); Carnarvon (Swillies); Denbigh (Abergele). Scotland: Edinburgh (Joppa, Newhaven); Kincardine (Girdleness); Aberdeen; Orkney Islands; Argyle (Southend, Kintyre, Campbeltown); Bute (Isle of Cumbrae); Ayr (Ballantrae). Ireland: Bantry Bay, Co. Cork; Giant's Causeway, Co. Antrim; Milltown Malbay, Co. Clare; Roundstone, Co. Galway, not uncommon on the shores of the S. & W. Channel Islands (Jersey, Guernsey, Alderney). Not uncommon on the shores of the S. and W. of England and Ireland and those of the Channel and Orkney Islands. Rare elsewhere in Britain. — *β angustior* (Turn.). Not uncommon on the southern and western shores of England and Ireland; Orkney Islands.—*γ dilatata* (Turn.). S. coast of England; Orkney Islands.

D. Dresnayi Lamour. Coasts of Cornwall (Lizard) and Devon (Plymouth, dredged off the Eddystone Lighthouse). Ireland (Moville Bay, Lough Foyle, twenty miles below Londonderry). Very rare.

Fam. Dictyosiphonaceæ Thur.

Gen. 72. Dictyosiphon Grev.

D. fæniculaceus Grev. Coasts of Cornwall (Falmouth, Torpoint); Devon (Plymouth, Exmouth, Sidmouth); Dorset (Weymouth); Yorks (Filey, Scarborough); Durham (Sunderland); Northumberland (Cullercoats, Alnmouth, Bamborough, Holy Island, Berwick); Isle of Man. Wales: Carnarvon (Bangor); Anglesea (Penmon Point, Llanvælog, Puffin Island). Scotland: Berwicks. (Burnmouth); Haddington (Dunbar, Longniddry); Edinburgh (Joppa); Fife (Kinghorn, Earlsferry, Elie, Fife Ness); Forfar (Arbroath); Aberdeen; Orkney Islands; Argyle (Oban, Campbeltown); Bute (Isles of Bute, Arran, and Cumbrae); Renfrew (Gourock, Wemyss Bay). Ireland (Bantry Bay, Co. Cork; Belfast, Co. Antrim, &c., frequent). Channel Islands (Jersey, Guernsey). Not common.—*β flaccida* Kjellm. Scotland: Haddington (North Berwick).

D. hispidus Kjellm. (= *D. fæniculaceus* var. *hispidus* Kjellm., Holm. & Batt. Rev. List). Coasts of Northumberland (Berwick); Haddington (Dunbar, Longniddry); Edinburgh (Joppa); Fife (Earlsferry, Fife Ness). Ireland (Kingstown, Co. Dublin). Rare.

D. hippuroides Kütz. Coasts of Yorks (Filey, Scarborough); Northumberland (Holy Island, Berwick). Wales (Anglesea, Carnarvon). Scotland: Berwick (Burnmouth, Eyemouth); Haddington (Dunbar, North Berwick); Edinburgh (Joppa); Fife (Kinghorn, Earlsferry, Elie, Fife Ness); Forfar (Arbroath); Orkney Islands; Bute (Isles of Arran and Cumbrae); Ayr (Fairlie). Common on

the shores of the North of England and Southern Scotland; probably not uncommon on those of the North of Scotland and Ireland. —*β fragilis* Kjellm. Orkney Islands. Ireland (Kilkee, Co. Clare). Rare.

D. Ekmani Aresch. *Observationes Phycologicæ*, part iii. p. 52. Epiphytic on *Scytosiphon lomentarius* and *Cystoclonium purpurascens* in pools near high-water mark. Coasts of Cornwall (Scilly Islands, June, 1899, E. George; Falmouth, F. W. Smith); Dorset (Weymouth, April, 1892, E. A. B.); Northumberland (Berwick, July, 1895; E. A. B.). Scotland: Fife (Kinghorn, Dr. R. K. Greville in Herb. Batters).

D. Chordaria Aresch. Coasts of Northumberland (Berwick). Scotland: Forfar (Arbroath); Bute (Isle of Cumbrae); Ayr (Portincross, Fairlie). Rare. — *β gelatinosa* Strömf. Orkney Islands (N. Ronaldsay). Very rare.

D. mesogloia Aresch. Coast of Northumberland (Holy Island). Scotland: Haddington (Dunbar, North Berwick, Longniddry); Fife (Earlsferry, Elie, St. Monance); Cromarty; Isle of Bute; Ayr (Fairlie). Very rare.

Gen. 73. Gobia Reinke.

G. baltica Reinke. Southern Scotland: Haddington (Dunbar); Bute (Kilchattan); Ayr (Fairlie). Very rare.

Fam. Punctariaceæ Thur.

Gen. 74. Mikrosyphar Kck.

M. Porphyræ Kck. Coast of Kent (Folkestone). Probably not uncommon.

M. Polysiphoniæ Kck. Coast of Northumberland (Berwick). Probably not uncommon.

Gen. 75. Phæostroma Kck.

P. pustulosum Kck. Coasts of Devon (Seaton); Northumberland (Berwick). Scotland: Bute (Isle of Cumbrae). Probably not uncommon.

P. prostratum Kck. S.W. coast of Scotland: Bute (Isle of Cumbrae). Rare.

Gen. 76. Symphyocarpus Rosenv.

S. strangulans Rosenv. Coasts of Northumberland (Berwick) and Bute (Isle of Cumbrae). Rare.

Gen. 77. Litosiphon Harv.

L. pusillus Harv. Coasts of Cornwall (Scilly Islands, Trevone Bay, St. Minver, Mount's Bay, Falmouth, Looe); Devon (Plymouth, Torquay, Teignmouth, Sidmouth); Dorset (Weymouth, Swanage); Northumberland (Alnmouth, Berwick); Cheshire (Hilbre Island); Isle of Man. Wales: Carnarvon (Bangor); Anglesea (Towyn-y-Capel). Scotland: Berwicks. (Burnmouth); Haddington (Dunbar); Fife (Elie, Pittenween); Aberdeen; Orkney Islands; Argyle (Appin, Oban); Bute (Isles of Arran and Cumbrae); Ayr (Saltcoats, Ardrossan). Ireland: Ballycottin, Co. Cork; coast of

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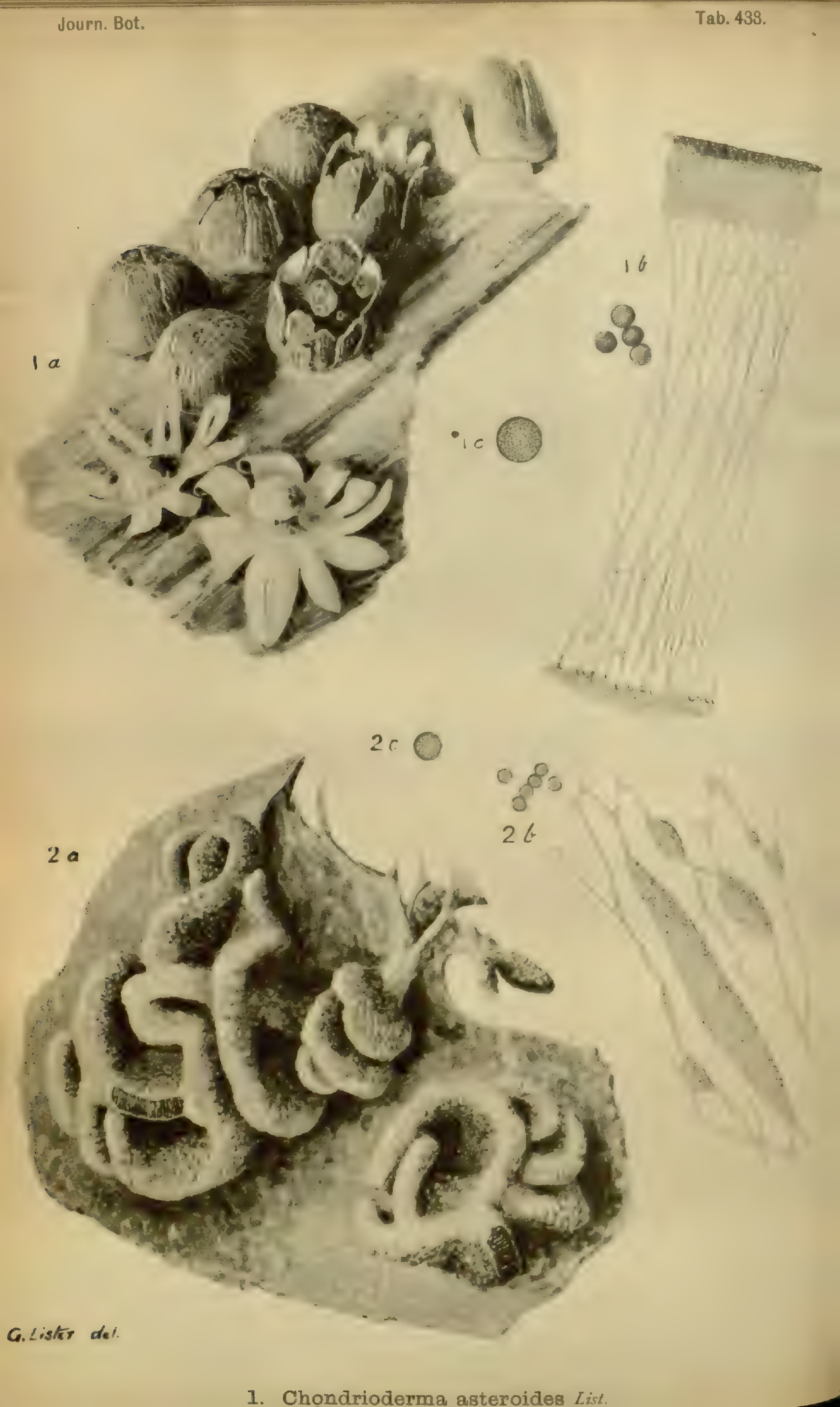

G. Lister del.

1. Chondrioderma asteroides *List.*

NOTES ON MYCETOZOA.

By Arthur Lister, F.R.S., and Miss G. Lister.

(Plate 438.)

Chondrioderma asteroides, sp. n. (Fig. 1). In January, 1902, Miss Agnes Fry collected a number of species of Mycetozoa in the grounds of Sir Thos. Hanbury, La Mortola, Ventimiglia, and she kindly sent us the fruits of her search for examination. Among them is a species of *Chondrioderma* with characters unlike those of any other of the genus with which we are acquainted; it is not represented in any collection to which we have had access, and appears to have been hitherto undescribed. The gathering consists of about four hundred sporangia in various stages of maturity, on pine needles and Acacia leaves. The plasmodium was not observed. The sporangia are gregarious, hemispherical or slightly conical, mostly sessile on a broad base, rarely shortly stalked; the colour is generally dull brown, sometimes bright chocolate brown and exceptionally pale buff; the surface is marked with parallel dark lines or shallow furrows extending from the base to near the apex, where they are continued in a broken reticulation; the sporangium-wall is thick and brittle, densely charged with round granules of lime; it consists of an outer coloured layer, characteristic of the Leangium division of the genus *Chondrioderma*, closely combined with the thick white inner layer, and this again is lined with a delicate colourless membrane, to which the capillitium is attached; the wall dehisces in a stellate manner into about eight to twelve reflexed lobes, snow-white on the inner side; it is sometimes split into many narrow laciniæ, while the central part breaks up into fragments that remain adhering to the capillitium. The columella is hemispherical or subglobose, white or pale cream-coloured. The short stalk, when present, is white, thick, and filled with lime, and the rows of sporangia on the pine needles are commonly connected by a streak of dense white hypothallus. The capillitium consists of extremely slender, nearly straight, but anastomosing colourless threads. The spores are purple brown, minutely warted, 10 μ diam.

The description of *C. vaccinum* Rost. led us to question whether Miss Fry's specimens might not be brought under the definition of that species in Rostafinski's *Monograph*, p. 180; but except for the reticulation on the sporangium-wall, the description does not well apply. *C. vaccinum* has only been found in Algeria, and Rostafinski says (*l.c.*):—"I have only seen the very meagre specimen in the collection of Montagne; I am not therefore certain whether the myxomycete is a distinct species or a variety of *C. testaceum*."

The La Mortola gathering appears to be most nearly allied to *C. radiatum* Rost., where we occasionally meet with delicate colourless capillitium, especially in specimens from the United States; the spores also resemble those of that species. It differs in the

generally sessile habit, in the dark striæ on the outer sporangium-wall, and in the regular stellate dehiscence into numerous reflexed lobes, recalling, in this feature, *C. Trevelyani* Rost. The name *Chondrioderma asteroides* is given to the species on account of the last-mentioned striking character.

Physarum gyrosum Rost. (Fig. 2). From the examination of the type of this species in the Strassburg collection, we were led to suppose that it was an ecorticate form of *Fuligo septica*. The specimen is on a green leaf, and is much injured; but in one part it is sufficiently perfect to show its character, and of this a camera lucida drawing was made. It consists of a small rosette of confluent compressed sporangia with capillitum containing fusiform lime-knots and numerous hyaline threads. The spores resemble those of *F. septica*, and measure 8–10 μ diam. There are on the same leaf the remains of several other small æthalia. We have been favoured by Dr. Jahn with two specimens of a similar form in perfect condition gathered by Prof. Magnus in a hothouse in the University Gardens, Berlin—one in June, 1895, and the other in August, 1898. The two gatherings agree in all respects except that the spores of the former measure 6–7 μ, and those of the latter 9–10 μ. The shape of the æthalia reminds one of small confluent growths of *Physarum bivalve* Pers. They are grey in colour, and are seated on a pinkish hypothallus, as in the Strassburg type; but in the latter the pink colour extends to some extent into the sporangium-walls. Dr. Jahn is of opinion that *Physarum gyrosum* is a distinct species; he says it is not of unfrequent occurrence in the hothouses in the Berlin Gardens, creeping over the green leaves, and thereby doing injury to the young plants in the border. *Fuligo septica* also occurs in one of its usual forms in the same hothouses. He mentions finding ecorticate æthalia of *F. septica* in woods which are certainly like *P. gyrosum*, but they did not show the regular serpentine character and the constant small size of the latter form. The fact that the Berlin specimens of *P. gyrosum* were found in a hothouse might suggest that its special characters are due to the influence of the warm and moist atmosphere; but among a remarkably interesting series of specimens from South America submitted to us by Dr. Jahn, he sends one of almost precisely similar form to the Berlin gatherings, collected by Dr. A. Möller at Blumenau, Brazil, in March, 1893. It has the same winding compressed and confluent sporangia, forming a small æthalium, 0·2–0·3 mm. in width, seated on a pinkish or dull red hypothallus on a green herbaceous leaf; the capillitium has the same character with white lime-knots, and the spores measure 8–9 μ diam. The difference in the size of the spores in the two gatherings by Prof. Magnus is striking, but a similar difference is met with in *F. septica*, to which *P. gyrosum* is undoubtedly nearly allied; but we agree with Dr. Jahn in his conclusion, that these specimens confirm the integrity of *P. gyrosum* as a distinct species.

On the Mycetozoa of Bohemia recorded by Dr. L. Celakovsky, Jr.

Dr. Ladislav Celakovsky, Jun., published a volume in 1893, entitled *Die Myxomyceten Böhmens* (in *Archiv der Naturwissenschaft*, vii. Band, No. 5, Prag), in which he enumerates about ninety-four species of Mycetozoa found in Bohemia. The work is excellently illustrated, and is a record of much earnest investigation both in the field and study. We had the privilege of a visit from Dr. Celakovsky in 1896, when he came to London, and examined the British Museum collection of Mycetozoa. He brought with him specimens of about fifty of the most important species that had come under his notice, including several rare types, and obligingly presented us with portions of gatherings on which he had founded his descriptions; several of these were species which he had mentioned in his work as new. We carefully examined these specimens together, comparing them with others in our own collection, and were generally in complete agreement in our determination. We have already had occasion to refer to some of his type-specimens in articles published in this Journal; other forms, however, described in his work as new species, were found to be not specifically distinct from those previously known, and come within the range of variation to which these species are subject. It is desirable that the conclusions we arrived at should be published, and, with Dr. Celakovsky's permission, we give a list of the names requiring correction :—

Arcyria clavata Cel. fil. Myx. Böhm. p. 29 = *A. ferruginea* Saut.

Comatricha dictyospora Cel. fil. *l. c.* 49 = *C. typhoides*, var. *β heterospora* Rex.

Tilmadoche nephroidea Cel. fil. *l. c.* 69 = *Physarum nutans* Pers., var. *γ leucophæum*.

Trichia Rostafinskii Cel. fil. *l. c.* 37 = *T. contorta* Rost., var. *β inconspicua* (*T. inconspicua* Rost.).

Trichia pachyderma Cel. fil. *l. c.* p. 38 = *T. contorta* Rost.

Trichia aculeata Cel. fil. *l. c.* p. 34 = *T. varia* Pers.

Badhamia citrinella Cel. fil. *l. c.* p. 76, pl. iv. fig. 1. In this specimen the capillitium consists of large branching and angled orange-yellow lime-knots, connected by scanty hyaline branching threads. Dr. Celakovsky described it as truly that of a *Badhamia*, but on further examination on his return from England he has found sporangia with capillitium, as noted above. We place the species as *Physarum auriscalpium* Cke., as defined in *Journal of Botany*, April, 1898, p. 115. Although the forms embraced by the main centres of *P. auriscalpium* and *P. Berkeleyi* Rost. may well be considered as constituting distinct species, yet, as mentioned in that article, they are connected by intermediate links, so that it is difficult to draw a sharp line of distinction between them, while it only leads to confusion to multiply specific names in so varying a group. The figure of the sporangia of *P. Berkeleyi* in the plate accompanying the paper referred to fairly represents those of Dr. Celakovsky's gathering, but the capillitium drawn on the same plate differs from

that of his specimen, in which the lime-knots are larger, and the hyaline threads so much reduced that it is brought under *P. auriscalpium*.

PERICHÆNA CORNUVIOIDES Cel. fil. Myx. Böhm. p. 26, pl. 1, figs. 6 and 7. We consider this to be a form of *Hemitrichia Karstenii*; the capillitium is accurately described and figured (*l. c.*), with small bladdery expansions or open cups on the sides of the threads. Dr. Celakovsky does not agree with this determination, on account of the absence of the spiral markings on the capillitium, characteristic of the genus *Hemitrichia*. We have, however, a specimen that we place as *H. Karstenii* from near Birmingham, in which the capillitium in some of the sporangia is identical with that from Bohemia; but in one sporangium the spiral thickenings are clearly visible on some parts of the threads, together with the vesicular expansions. In our opinion both gatherings are abnormal forms.

Among the specimens for which we are indebted to Dr. Celakovsky are several of special interest, from their having been presented to him by Dr. Raciborski as types of new species, or attested by him as rightly named. On some of these we offer the following remarks:—

JUNDZILLIA TUBULINA Racib. *l. c.* p. 46. This is the form described in the Brit. Mus. Catalogue, p. 112, as *Stemonitis splendens*, var. *γ flaccida*.

COMATRICHA MACROSPERMA Racib.; Myx. Böhm. p. 52, leg. Cel. fil. August, 1889, "teste Raciborski." The specimen submitted to us consisted of several sporangia mounted in glycerine jelly. We carefully compared them with the type of *Comatricha laxa* Rost. in the Strassburg Collection, and with our own gatherings, but we were unable to discover any character which could distinguish them specifically from that species; and in this conclusion Dr. Celakovsky concurs. The spores measure 8·5–11 μ.

LAMPRODERMA STASZCII Racib. The mounted specimen so named had a persistent purplish sporangium-wall, purple-brown spinose spores, 13 μ diam., and the strong capillitium characteristic of *L. physaroides* Rost.; the stalk was thick and short, ending in a globose columella. The shape of the columella varies in *L. physaroides*, and we possess specimens in which it is short and rounded. We could detect no distinctive character in the mounting to separate it from the last-named species.

ARCYRIA INERMIS Racib.; Zakopale, Tatra Gebirge, leg. Dr. Raciborski. This specimen is a frequent form of *A. ferruginea* Saut.; the capillitium is of the usual character, 6 μ broad in the upper part, forming a dense net with a few pointed free ends, narrowing into long and seldom branched threads 3 μ broad where they spring from the tube of the stalk; spores 9–10 μ diam.

A. IRREGULARIS Racib.; Krakov. leg. Dr. Raciborski, Aug. 26th, 1882. This is a fairly typical form of *A. incarnata* Pers. The capillitium has the usual spinose thickenings, with few or no attachments to the thin membranous cup of the sporangium-wall; spores 6–7 μ diam.

DESCRIPTION OF PLATE 438.

1. *Chondrioderma asteroides* List. sp. n.—*a*. Sporangia dehiscing in a stellate manner. 1*b*. Capillitium threads attached above to the sporangium-wall (seen in section), below to the columella, with four spores, × 280. 1*c*. Spore, × 600. From Ventimiglia, North Italy.

2. *Physarum gyrosum* Rost.—*a*. Two æthalia, each slightly broken, and showing the dark mass of spores and parallel lime-knots of the capillitium, × 20. 2*b*. Capillitium and five spores, × 280. 2*c*. Spore, × 600. From the University Gardens, Berlin.

WEST SUSSEX PLANT-NOTES FOR 1901.

By Rev. E. S. Marshall, M.A., F.L.S.

I learn from the Rev. Dr. Arnold that he does not contemplate a new edition of his *Sussex Flora*—a capital handbook, but on rather too small a scale, and now to some extent out of date. It is much to be wished that one of our younger botanists, such as Mr. C. E. Salmon (whose valuable paper in last year's Journal proves him to possess a considerable grasp of the subject), may undertake a more ambitious work, somewhat on the lines of Mr. Townsend's classical *Flora of Hampshire*. Undoubtedly a great deal remains to be done before a fairly exhaustive account of Sussex plants can be compiled (as the numerous additions in the above-named paper, Mr. Whitwell's in the present volume, and my own, sufficiently indicate); indeed, I believe that it will eventually prove to be the richest county in England.

Where no number is given, I intend Dr. Arnold's district I. (W. Rother); only a few excursions were made into district II. (Arun). New records for v.-c. 13 are starred, and occasionally my reference-numbers are added.

The Revs. E. F. Linton and W. Moyle Rogers stayed with me for about a fortnight apiece in July and August, adding a good many species, particularly among the brambles (Mr. Rogers has authenticated most of these); I had also the advantage of shorter visits from Messrs. Shoolbred, Salmon, and Arthur Bennett, to all of whom I am indebted for their help, as well as to Mr. Townsend and others.

Ranunculus trichophyllus Chaix. Pond in a field at Upper Norwood, Lavington.—*R. Drouetii* Godr. Ditch near Sidlesham.—*R. Baudotii* Godr. Clymping.—*R. sardous* Crantz. Selsey.

Aquilegia vulgaris L. Hangers of the chalk, near Sutton; native.

Papaver somniferum L. Field below the downs, Lavington.—*P. dubium* L., *P. Argemone* L. Sandy fields, Lavington and Coates.

Neckeria claviculata N. E. Br. Selham.

Fumaria Boræi Jord. Bank by Selsey Church.

Nasturtium sylvestre R. Br.; *N. palustre* DC.; *N. amphibium* R. Br. II. All these occur by the Arun below Pulborough, the first-named being quite plentiful.

Barbarea præcox R. Br. Roadsides near Graffham, Selham, and Lodsworth.

Arabis hirsuta Scop. Lavington Churchyard.

Cardamine amara L. Abundant by the stream between Lurgashall and Selham.—*C. flexuosa* With. Midhurst, Graffham, Lodsworth. —*C. pratensis* L. Abounds with double flowers in a meadow at the Rectory, Graffham.

Erophila stenocarpa* Jord. Sandy fields, Selham and Lavington. —E. virescens* Jord. Top of the downs, above Graffham and Heyshott; on the greensand about Selham. On Duncton Down I found a plant which is near *E. hirtella* Jord.; but I have had no opportunity for comparison with type-specimens.

Cochlearia danica L. Plentiful on shingles between Pagham and Selsey.

Erysimum cheiranthoides L. Native by the Rother, between Petworth and Fittleworth, and by the Arun, below Pulborough; a weed of cultivation at Selham.

Lepidium hirtum Sm. (*L. Smithii* Hooker). Called "common" in *Sussex Flora;* but it can hardly be so on the chalk or clay, and I have only seen it on sandy banks at Selham.

Thlaspi arvense L. Sandy field, Norwood, Lavington.

Teesdalia nudicaulis R. Br. Sparingly on Graffham Common and near Heyshott.

Crambe maritima L. Pagham; between Earnley and Selsey Bill.

Cakile maritima Scop. Thorney; very scarce.

Viola palustris L. Swamp, south of Graffham Common.—*V. hirta* × *odorata*. On the chalk, Lavington and Graffham; usually scentless, but one form was distinctly sweet-smelling. A beautiful pink-flowered *V. odorata* occurs at Graffham, the white form being quite common.—*V. Riviniana* × *silvestris*. Beechen hangers, Graffham; no doubt frequent, as *V. silvestris* abounds on the chalk, beginning to bloom fully three weeks earlier than its ally.

Polygala oxyptera Reichb. Downs above Barlavington. Heyshott Down; *Salmon* sp.

Frankenia lævis L. About a mile south of Bosham.

Dianthus prolifer L. I am glad to say that this is still plentiful about Pagham, where it was found last year at intervals over an area fully a mile long by half a mile wide.

Silene Cucubalus Wibel var. *puberula* Syme. Frequent in chalky fields.—*S. anglica* L. Coates; between Graffham and Heyshott.—*S. noctiflora* L. Field between Farm Hill and Barlavington Down (casual or colonist); *Linton* sp.

Cerastium quaternellum Fenzl. Coates Common.—*C. tetrandrum* Curt. I. Aldwick; Clymping Sands. II. Littlehampton.—**C. pumilum* Curt. Rough bank, Oxen Down, between Upwaltham and East Dean; facing south. New to Sussex.—*C. semidecandrum* L. Graffham; Sutton; Ambersham Common, &c.

**Stellaria umbrosa* Opiz. var. (*S. neglecta* Weihe, *S. media* var. *major* Koch). Abundant by the roadside between Halfway Bridge and Selham (No. 2559). Koch simply describes his variety as "floribus decandris," giving *S. neglecta* and *S. umbrosa* as synonyms;

but the flowers are very much larger than in *S. media* (recalling *S. graminea*), as also are the seeds. It apparently differs from *S. umbrosa* only in having hairy pedicels and calyx, blunt seed-tubercles, and less acuminate lower leaves; I may add that Mr. Townsend, on seeing a fresh specimen, named it *S. umbrosa* without hesitation. Mr. Bennett writes:—"Dr. Ascherson, when here last year (at my house), insisted on this—that our separation of *umbrosa* and (*major*) *neglecta* was an error—they were different forms of the same thing (as you have it)." I therefore propose for the present plant the name of †*S. umbrosa* Opiz. var. *decipiens*.—*S. palustris* Retz. II. Ditches near the Arun, North Stoke.

Arenaria peploides L. Aldwick; Earnley.

Sagina ciliata Fr. I. Sandy fields, Lavington, and between Graffham and Heyshott. II. Wall-top, near Greatham Church.

Lepigonium salinum Kindb. var. *neglectum* (Kindb.). Earnley, Pagham, &c.—*L. marinum* Wahl. var. *glandulosum* Druce. Thorney; Earnley; Pagham—the prevailing form in this district. I have not seen specimens of Mr. Druce's plant; but the description tallies well.

Hypericum Androsæmum L. Scarce on the gault, Lavington.—*H. dubium* Leers. Roadside by the Pottery, Lavington.

Althæa officinalis L. II. Ditch near the Arun, above North Stoke.

[*Malva pusilla* Sm. I. Fishbourne Tide-mill; the Rectory, Graffham. II. Farmyards, Amberley. Introduced with foreign grain.]

Radiola linoides Roth. Ambersham Common.

Linum angustifolium Huds. Between Sidlesham and Pagham.

Geranium pyrenaicum Burm. fil. Waste ground by Bosham Station; clover-field, Selham; roadside between Burton Park and Petworth Station.—*G. pusillum* L. Coates; Graffham.—*G. Robertianum* L. var. *purpureum* (Vill.). Abundant on the shingles between Pagham and Selsey; carpels glabrous.

Rhamnus Frangula L. Lavington, Duncton, and Coates Commons.

Ulex nanus Forst. Graffham Common.

Trigonella purpurascens Lam. Pagham, with *Trifolium striatum* L.

Medicago lupulina L. var. *scabra* Gray (*Willdenowiana* Koch). Banks and shingles about Pagham and Sidlesham, with the type.

Trifolium squamosum L. (*T. maritimum* Huds.). Selsey; abundant between Sidlesham and Pagham.—*T. arvense* L. Coast, Pagham; plentiful.—*T. scabrum* L. Clymping Sands.—*T. fragiferum* L. Common on the coast; meadow at Graffham, on the gault.—*T. procumbens* L. var. *majus* Koch. Sandy corn-field near Norwood Farm, Lavington; heads large, of the same golden-yellow as in *T. agrarium* L.

Lotus tenuis Waldst. & Kit. In profusion about Pagham. Downs near Heyshott; *Salmon* sp.

Ornithopus perpusillus L. Ambersham Common, towards Heyshott.

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† Mr. Britten tells me that the name *S. umbrosa* Opiz is probably invalid. My point is, that what we have been calling *umbrosa* and *neglecta* are type and variety of one species, or subspecies.—E. S. M.

Hippocrepis comosa L. Downs above Sutton. *Onobrychis* also occurs; scarce, but apparently aboriginal.

Vicia angustifolia L. var. *Bobartii* Koch. Near Graffham; probably common on the lower greensand.

Lathyrus sylvestris L. In several places on the chalk, near Sutton.

Prunus Cerasus L. Copses on the gault, Graffham, Lavington, and Burton. I believe *P. Avium* L. to be frequent in district I.

†*Rubus Idæus* L. Frequent in district I., both on chalk and sand.—*R. fissus* Lindl. Roadside, Lavington Common; copse on Duncton Common.—*R. suberectus* And. Copse near Burton Rough; near Petworth Station.—*R. plicatus* Wh. & N. I. Ambersham Common; Graffham Common; Coates Common; near Upper Norwood, Lavington; Midhurst Common. Lychmere Common; Shottermill Common, *Rogers*. II. Greatham Common. — **R. nitidus* Wh. & N. Ambersham Common, between Graffham and Heyshott. Fittleworth Common (Rogers) is a slip of memory.—*R. holerythros* Focke. Woods, Bignor Park.—*R. carpinifolius* Wh. & N. South side of Ambersham Common.—*R. Lindleianus* Lees. I. Abundant on the lower greensand from Midhurst to Fittleworth; Blackdown, *Rogers*. II. Greatham Common.—*R. erythrinus* Genev. Lavington; Burton; Graffham; between Bignor and Madehurst. Blackdown, *Rogers*.—*R. rhamnifolius* Wh. & N. Fittleworth; Petworth; Coates; Lavington; Graffham; Heyshott; Midhurst. Lynchmere; Blackdown; Shottermill, *Rogers*. Common on the sand.—*R. pulcherrimus* Neum. I. Fittleworth; Burton; Duncton Common; Lavington; Graffham; Heyshott; Midhurst. Blackdown; Lynchmere; Shottermill, *Rogers*. II. Greatham Common. — *R. dumnoniensis* Bab. Between Westerland Farm and Lavington Common. — **R. Selmeri* Lindeb. In some plenty on the coast, south of Bosham. — **R. calvatus* Blox. Lavington; Petworth; Burton.—*R. leucandrus* Focke. Hesworth Common, near Fittleworth (a form tending towards *R. gratus*); Midhurst Common; Ambersham Common, *Rogers*.—*R. argentatus* P. J. Muell. Fittleworth; Heyshott; Midhurst. — *R. pubescens* Wh. var. *subinermis* Rogers. Fittleworth; Petworth; Graffham; Lavington; Coates; Madehurst; Slindon. — *R. macrophyllus* Wh. & N. Copse near Burton Rough; Graffham. — Var. *Schlechtendalii* (Wh.). Roadsides, Popple Hill, Lavington. — **R. Salteri* Bab. Plentiful, Midhurst Common; also between the two railway stations.—*R. micans* Gren. & Godr. Blackdown, *Rogers*.—*R. pyramidalis* Kalt. Petworth; Burton; Graffham; Lodsworth; Midhurst.—**R. lentiginosus* Lees. Remarkably abundant on the sand in this neighbourhood. Petworth; Coates; Burton, Duncton, Lavington, Graffham, and Ambersham Commons. A very distinct and handsome plant; showing strong affinity with *nitidus* and *sulcatus*, but usually having a more or less *glandular* panicle. The name *lentiginosus* (freckled) is not in the least descriptive of this Sus-

† Mr. Rogers has already published several of the undermentioned stations in his recent paper "On the Distribution of Rubi in Great Britain"; but I include these, as in most cases additional information is now given.

sex form. — *R. leucostachys* Schleich. Only less common than *R. rusticanus*; being found alike on chalk, sand, and clay.—*R. lasioclados* Focke var. *angustifolius* Rogers. Fittleworth; Midhurst. — **R. Borreri* Bell Salt. Little Bury (a fir-wood), Norwood, Lavington, *Rogers*.—**R. Radula* Wh. subsp. *anglicanus* Rogers. Lodsworth; near Bosham.—*R. echinatus* Lindl. Fittleworth; Petworth; Coates; Lavington; Graffham; Heyshott; Midhurst. — *R. Babingtonii* Bell Salt. Hesworth Common; near Burton. Lynchmere; Shottermill, *Rogers*.—*R. Lejeunei* Wh. & N. var. *ericetorum* Lefv. Fittleworth; Lavington, Duncton, and Ambersham Commons; chalk-pit, Graffham, &c. — *R. mutabilis* Genev. Midhurst Common (very scarce).—**R. obscurus* Kalt. Abundant on the bushy or wooded down-lands, north of Madehurst and Slindon, and near Upwaltham; exactly my Wexford plant, determined as typical by Dr. Focke. One of our most beautiful brambles, when in flower, and (to my mind) among the most distinct glandular ones.—**R. fuscus* Wh. & N. Downs above Bignor; Midhurst Common.—Var. **nutans* Rogers. Lavington; Graffham; Midhurst Common.—*R. pallidus* Wh. & N. Old Bury, Lavington.—Var. *leptopetalus* Rogers. Near Madehurst and Upwaltham; Lychmere; Shottermill, *Rogers*.—*R. foliosus* Wh. & N. Burton Park; Midhurst Common. Shottermill; Blackdown, *Rogers*. —*R. rosaceus* Wh. & N. Between Graffham and Heyshott; Midhurst Common, towards Woolbeding: these are the usual lower greensand form of West Surrey, which I understand to be var. *bercheriensis* Druce. A plant tending towards *R. pallidus* occurs near Graffham.— Var. *infecundus* Rogers. Near Petworth Station. Blackdown, *Rogers*.—*R. adornatus* P. J. Muell. Roadside near Burton Rough.—*R. Marshalli* Focke & Rogers. Graffham Common; Norwood, Lavington. Blackdown; Shottermill, *Rogers*.—**R. Bellardi* Wh. & N. Old Bury, Lavington; thicket, north of Madehurst. — *R. dumetorum* Wh. & N. Fittleworth; Graffham, &c. Rogate, *Rogers*.—Var. *tuberculatus* Bab. Near Petworth Station.—*R. corylifolius* Sm. (*sublustris*). Fittleworth; Coates; Lavington; Heyshott; Midhurst. Lychmere; Blackdown, *Rogers*.—Var. *cyclophyllus* Lindeb. Midhurst Common; Graffham, both on the gault and on the chalk.—*R. cæsius* × *Idæus*. Downs between Madehurst and Bignor; a single drupelet (red) was found.

Potentilla procumbens Sibth. Not uncommon about Lavington, Graffham, and Heyshott.—*P. argentea* L. Ambersham Common; Graffham Common; Coates; Selham.

Agrimonia odorata Mill. Roadsides, near Burton Rough and on Duncton Common; Westerland, Lavington.

[*Poterium polygamum* Waldst & Kit. Plentiful in a sainfoin-field near Heyshott.]

Rosa tomentosa Sm. Lavington; Burton.—*R. rubiginosa* L. Near Burton Mill. Downs above Graffham (scarce), *Rogers* sp.—*R. micrantha* Sm. Quite the most abundant rose on the chalk range, from Cocking to Bury. — *R. obtusifolia* Desv. On the gault, about Lavington and Graffham; both type and var. *frondosa* Baker occur. *R. canina* L., vars. *lutetiana*, *dumalis*, and *urbica* are all frequent.—

Var. *andegavensis* (Bast.) occurs between Graffham and Lavington, and north of Burton Park, as a form with bristly fruit.—Var. *dumetorum* (Thuill.). Bury.—*R. glauca* Vill. var. *subcanina* Christ. Graffham; Lavington. Strongly subcristate, with hairy styles. Mr. Rogers agrees with me in considering it the same as Messrs. Groves' Kentish *R. Crepiniana* Déségl.—*R. stylosa* Desv. var. *systyla* (Bast.). Thorney; plentiful near Birdham; Heyshott; rather common about Graffham and Lavington, especially on the gault.

Chrysosplenium oppositifolium L. Lodsworth; near Graffham.

Ribes nigrum L. Near Graffham and Burton this looks like a native, and I incline to think that it really is so.

Sedum Telephium L. Near Graffham; native, on the gault.

Drosera intermedia Hayne. Sparingly on Duncton Common.

Myriophyllum verticillatum L. II. Amberley Wild Brooks, in ditches.

Callitriche hamulata Kuetz. I. Graffham. II. North Stoke.—*C. obtusangula* Le Gall. Between Chichester and Birdham.

Peplis Portula L. Ambersham Common.

Epilobium angustifolium L. Madehurst; Lavington; Graffham; &c. On the shingles, Pagham, a curious place for it.—*E. lanceolatum* Seb. & Maur. Hedgebank between Graffham and Selham; plentiful in a lane near Lodsworth. Shoreham is the only station mentioned in *Sussex Flora*.—*E. roseum* Schreb. By the Rother, between Petworth and Fittleworth; streamlet between Coates and Burton; Heyshott village (one plant of *E. parviflorum* × *roseum* was found here).—*E. adnatum* Griseb. Graffham; Birdham. *E. obscurum* is fairly common.—**E. Lamyi* F. Schultz. Lavington; Graffham; Coates; between Petworth and Northchapel.

Eryngium maritimum L. Between Aldwick and Pagham.

Cicuta virosa L. II. Mr. E. M. Holmes informs me that this has recently been found growing plentifully by a pond in a park near Pulborough. I have very strong grounds for distrusting the station in Dist. VI. given in *Sussex Flora*; Borrer certainly reported *Œnanthe Phellandrium* as this species in East Kent, being at that time unacquainted with the true plant.

Carum segetum Benth. & Hook. fil. Pagham.

Sium latifolium L. II. Ditches, a little north of Amberley Castle; also near the Arun at North Stoke.

Fœniculum vulgare Mill. Shingles, west of Pagham; only seen in one spot.

Crithmum maritimum L. I. Earnley. II. Littlehampton. Very scarce in both places.

Œnanthe Lachenalii C. Gmel. Pagham.—*O. Phellandrium* Lam. II. Amberley Wild Brooks.

Caucalis nodosa Scop. About Sidlesham, Pagham, and Selsey.

Adoxa Moschatellina L. Abundant at the foot of the downs; Lavington, Graffham, Heyshott. Swampy copse near South Ambersham, &c.

Sambucus Ebulus L. Roadside, west of Lavington House.

Viburnum Opulus L. Plentiful in wet copses of the Rother valley.

Rubia peregrina L. Copse on the north slope of the downs, near Sutton.

Galium Cruciata Scop. Extraordinarily plentiful in the Midhurst and Petworth neighbourhood.—*G. palustre* L. var. *elongatum* (Presl). II. Amberley Wild Brooks. Var. *Witheringii* (Sm.) appears to be the usual West Sussex form.—*G. tricorne* Stokes. Field on the downs, above Sutton, *Linton* sp.

Asperula odorata L. Graffham; scarce.

Valeriana Mikanii Syme. Abundant in copses on the downs above Graffham and Lavington, ascending to 800 feet; flowers frequently white. *V. sambucifolia* Willd. is frequent on the lower greensand in damp places; they are evidently confused in *Sussex Flora*.

Valerianella olitoria Poll. Lodsworth; Pagham.—*V. dentata* Poll. Norwood, Lavington; Bosham.

Scabiosa Columbaria L. Graffham Down. Probably common on the chalk hereabouts; but I have not paid special attention to this point.

Erigeron acre L. Shingles, Pagham; between Duncton and Petworth; near Graffham.

**Filago apiculata* G. E. Sm. Sandy field near Graffham; Norwood Farm, and near Lower Barn, Lavington. Mostly the scarce form with straw-coloured phyllaries; only two or three specimens of the usual red-tipped plant were found.—*F. spathulata* Presl. Corn-fields, north of Bosham.—*F. minima* Fr. Ambersham, Graffham, and Coates Commons; also near Petworth.

Gnaphalium uliginosum L. Frequent in Dist. I.—*G. sylvaticum* L. Field, Popple Hill, Lavington; Selham; railway bank, near Petworth.

Inula Conyza DC. Lavington, Graffham, &c.; frequent on the chalk.

Matricaria inodora L. var. *salina* Bab. Coast, from Bognor to Earnley; rather common.

Tanacetum vulgare L. Plentiful and native, by the Rother.

Artemisia vulgaris L. The only form that I have observed is var. *coarctata* Forss.

Petasites officinalis Moench. Graffham, in small quantity.—*P. fragrans* Presl is well established in a lane by Lavington Church, and occurs under a garden wall at Aldwick.

Carlina vulgaris L. Graffham Down.

Arctium majus Bernh. I have seen this in several parishes of Dist. I., chiefly on heavy soils; but should hardly call it "common" (*Sussex Flora*).—*A. minus* Bernh. A specimen from the wooded downs near Heyshott is considered by Mr. Bennett to be var. *paniculatum* Lange; it looked very distinct, when growing.

Carduus crispus × *nutans*. Field between Graffham and Heyshott; one plant, with plenty of both parents. *C. crispus* is common at the foot of the downs.

Serratula tinctoria L. Graffham and Lavington; scarce.

Centaurea nigra L. var. *decipiens* (Thuill.). Waltham Hill; border of Duncton Common. Too commonly connected with the

type by intermediates to allow of its being placed under *C. Jacea*, as Mr. F. N. Williams has done.—*C. Scabiosa* L. Graffham; Upwaltham.

Cichorium Intybus L. Near Sutton.

Picris hieracioides L. Heyshott; Graffham; railway-bank, Selham.—*P. echioides* L. Abundant in copses on the gault, Lavington; Graffham.

Crepis taraxacifolia Thuill. Abundant on the shingles between Pagham and Selsey; flowering early, and soon disappearing. I have little doubt that it is native here.

Hieracium murorum L. var. *pellucidum* Laest. Railway cutting, a little west of Petworth Station.—*H. rigidum* var. *acrifolium* Dahlst. Selham; Graffham; Lavington; Burton. Frequent on the sand.—**H. cantianum* F. J. Hanb. Between Graffham and Heyshott; Selham; near Lower Barn, Lavington. New to Sussex.—*H. boreale* Fr. Graffham; Selham; Lavington; Burton.—*H. umbellatum* L. Graffham; Ambersham and Duncton Commons: usually, if not always, the var. *coronopifolium* (Bernh.).

Hypochæris glabra L. Sandy field near Lower Barn, Lavington.

Taraxacum erythrospermum Andrz. Ambersham Common; Coates Common.—*T. palustre* DC. var. *udum* (Jord.). Plentiful near Burton Ponds; downs above Graffham—probably common.

Lactuca muralis Fresen. Lavington; Graffham.

Jasione montana L. Frequent on the sand; *e.g.* about Graffham, Duncton, Coates, and Lodsworth.

Phyteuma orbiculare L. Sparingly on Duncton Down and at Graffham.

Campanula glomerata L. Waltham Down; Rectory meadow, Graffham.

Specularia hybrida L. Norwood, Lavington.

Vaccinium Myrtillus L. Plentiful from Ambersham Common to Duncton Common.

Pyrola minor L. Fir-wood near Graffham.

Hypopitys Monotropa Crantz. Behind Lavington Church, abundant; Graffham and Heyshott, sparingly.

Statice rariflora Drej. In profusion and very fine at Bosham. I am convinced that Mr. Linton is right about his *S. Limonium* × *rariflora*, which only occurs where the two species grow together; approaching now one parent, now the other, and always readily separable from both, when living. *S. Limonium* L. var. *pyramidalis* Syme occurs here, but is much less plentiful than the type.

Primula acaulis × *veris*. The "oxlip" is common at Graffham and Lavington, principally on the gault. Dr. Arnold calls it "P. caulescens," but there is a true var. *caulescens* of *P. acaulis*. East Dean Wood is locally noted for its *white* primroses.

Lysimachia Nummularia L. Clay copses, Lavington; near Lodsworth.

Centunculus minimus L. Ambersham Common.

Blackstonia perfoliata Huds. Graffham, on the gault; scarce.

Erythræa pulchella Fr. Pagham; Wittrock's "forma subelongata," I believe.

Gentiana Amarella L. Common on the downs, wherever I have been.

[*Limnanthemum peltatum* S. P. Gmel. Extinct on Duncton Common; the pond, evidently artificial, burst its dam a good many years ago.]

Cynoglossum officinale L. Teglease, towards Duncton Down.

Myosotis repens L. Graffham. — *M. collina* Hoffm. Coates Common; South Ambersham; Selham.—*M. versicolor* Reichb. var. *Balbisiana* (Jord.). Roadside near Wibling's Farm, Graffham; extremely scarce, growing with the type.

Lithospermum officinale L. Duncton Hill; near Sutton.

Echium vulgare L. Coates.

Volvulus Soldanella Junger. I. Clymping Sands. I could not find it on the Littlehampton side of the Arun; so this is probably the station mentioned in *Sussex Flora*.

Cuscuta Trifolii Bab. Coast, Pagham, on broom and *Lotus;* unbroken downs above Sutton, on *Lotus* and various other plants. Though this is *usually* an imported species in clover-fields, I am satisfied that it is aboriginal in these two stations; the surroundings render its accidental introduction most improbable. Mr. Bennett writes:—"It seems that we must admit this as indigenous. I have once seen it in Surrey, on *Lotus*, &c., where it was very difficult to say otherwise—still, it may have had clover growing at some time near." Mr. C. P. Hurst has recently detected this species near the Wexford Station for *Diotis;* I know something of that neighbourhood, and cannot doubt its being native in such a remote and barren tract.

Verbascum Lychnitis L. var. *album* Mill. Truly wild near Madehurst and Slindon; the flowers dry brownish pink. One fine specimen of *V. Lychnitis* × *Thapsus* occurred with the parents.—*V. nigrum* L. Coates; Lavington; Graffham.

Linaria repens Mill. Pagham, *Rev. E. O. Edgell.* I failed to find it there.

Antirrhinum Orontium L. Norwood, Lavington.

**Scrophularia oblongifolia* Loisel. Combe of the downs, between Graffham and Lavington, abundant; pond, a little south of Chichester. Leaves pale, clear green, much longer than in *S. cinerea* Dum., which has them greyish and rather metallic in texture, the scale being entire, not emarginate; the latter is the common water-figwort in Dist. I., and occurs at Pulborough and Amberley in Dist. II.

Veronica polita Fr. var. *grandiflora* Bab. Plentiful in cultivated land at Bosham; the type also abounds there, and at Graffham, Selham, Coates, &c.—*V. montana* L. Graffham; Lodsworth.

Euphrasia Rostkoviana Hayne. Ambersham and Midhurst Commons.—**E. Kerneri* Wettst. (*teste* Townsend). Abundant on the open downs, from Bignor to Cocking; always, I believe, an unusually small-flowered form. — *E. nemorosa* Pers. Frequent. By Petworth Station; roadside, Lavington Common; downs above Heyshott, &c.

**Bartsia viscosa* L. Pagham, in two stations over half a mile apart; known to Mr. Edgell for several years.

**Rhinanthus stenophyllus* Schur, *pro var.* (*Alectorolophus stenophyllus* Sterneck). Downs above Sutton; discovered by Mr. Linton, who also found it between Barlavington and Upwaltham. New to Sussex, and not previously known for the South of England; a very marked plant indeed.

**Utricularia neglecta* Lehm. II. Amberley Wild Brooks; detected in flower by Mr. Linton. New to Sussex. We also found *U. vulgaris* L. blooming in profusion on the dried-up mud of a ditch close by.

Mentha arvensis L. var. *præcox* (Sole). II. Ditch near the Arun, below Pulborough; so named on the spot by Mr. Linton, and agreed to by Mr. Bennett. *M. arvensis* × *hirsuta* (*M. sativa* L.) is frequent by the river, between Pulborough and Amberley.

Calamintha Clinopodium Spenn. Lavington; Graffham; Heyshott; Upwaltham, &c. *C. arvensis* Lam. is quite common on the chalk in this neighbourhood.

Melissa officinalis L. Roadside, The Marsh, Graffham; not far from an old cottage.

Nepeta Glechoma Benth. A pretty form with rose-coloured flowers occurs for some distance on a roadside bank near Sutton.

Galeopsis Ladanum. All the plants that I have met with belong to *G. angustifolia* Ehrh., which is frequent in chalky fields, and grows on the shingles between Pagham and Selsey. *G. Tetrahit* L. is not uncommon in Dist. I.

Lamium amplexicaule L. Sandy fields, Lavington and Selham. —*L. Galeobdolon* Crantz. Frequent on the chalk hills; Lodsworth, on the sand.

Chenopodium polyspermum L. Shore of Chichester Harbour, opposite Birdham; Aldwick (both type and var. *cymosum*). — *C. murale* L. Sidlesham; *C. rubrum* L. also occurs here.—**C. botryodes* Sm. On saline mud, near the golf-links, Clymping. New to Sussex.—**C. glaucum* L. Farmyard, Graffham. New to Sussex.

Atriplex hastata L. About Emsworth and Thorney; between Fittleworth and Petworth. — *A. deltoidea* Bab. Abundant at Bosham; Aldwick; Graffham. It may be "very common" on the south coast, but I much doubt its being so inland.—*A. Babingtonii* Woods. In profusion on the shingles about Pagham. [*A. nitens* Schk. Rubbish-heap, Fishbourne Mill, *Rev. E. Ellman!*.]

Salicornia stricta Dum. Abundant at Emsworth; Thorney, Bosham, &c. This is the plant figured as *S. herbacea* in E. B. ed. 3; it is most distinct, and of a clear, bright, somewhat translucent green, fading to yellowish green in fruit. I have never seen any red tinge about it.—*S. ramosissima* Woods. A plant which must, I think, be placed here is abundant near Pagham (towards Selsey), and occurs in Thorney. This and the following were described by Woods as species (not varieties, as in the *London Catalogue*, ed. 9). — **S. pusilla* Woods. In two or three places south of Bosham—just the Hayling plant; Pagham—a bright red form or autumnal state, which Mr. Townsend agrees with me in so

naming. New to Sussex, I believe; always erect. — *S. appressa* Dum. Pagham, abundant; about a mile south of Bosham; Thorney, locally plentiful. Though usually rather a small plant, I have seen luxuriant specimens fully 15 in. long by 9 broad.—**S. lignosa* Woods. Gravelly shores about Bosham; in great abundance on the west coast of Thorney. Apparently new to Sussex, but doubtless confused with *S. radicans* Sm. Mr. Bennett, after collecting it with me at Bosham, wrote that he considered it "at least a good subspecies"; personally, I am disposed to give it full specific rank, the habit being so different. The identification with *S. fruticosa* L. (which has tubercled seeds) in *Fl. Hants* can hardly stand, though it tends in that direction.

Salsola Kali L. Thorney; very scarce.

Polygonum dumetorum L. Hedge near Heyshott, *Rogers* sp.—*P. Raii* Bab. Clymping Sands. — *P. maritimum* L. is, I fear, now lost at Bognor.—*P. minus* Huds. II. North Stoke. *P. maculatum* Trim. & Dyer. Ditch near Bosham Station. Not mentioned in *Sussex Flora;* but recorded in *Top. Bot.* for v.-c. 13.—*P. Bistorta* L. Meadow near the post office, Graffham; meadow near Fishbourne Mill.

Euphorbia platyphyllos L. Field border, Graffham; one fine plant.

Populus tremula L. Jays Furze, Lavington, &c.

Neottia Nidus-avis Rich. Heyshott; Graffham.

Cephalanthera pallens Rich. Graffham; Lavington.

Epipactis latifolia All. Plentiful and very fine on the wooded downs above Graffham.—*E. violacea* Boreau. Grounds of Friday's Hill House, Fernhurst, 1900, *Britten* sp.

Orchis pyramidalis L. Graffham; between Duncton Hill and Upwaltham, scarce. — *O. maculata* L. subsp. **cricetorum* Linton. Swamp, south of Graffham Common (named by Mr. Linton); the chalk plant is typical *maculata.*

Ophrys apifera Huds. Graffham; very rare.

Herminium Monorchis R. Br. Downs above Sutton.

Habenaria viridis R. Br. Graffham Down.

Iris fœtidissima L. Wood above Barlavington. The only form of *I. Pseudacorus* L. that I have met with is var. *acoriformis* (Bor.).

Narcissus Pseudo-narcissus L. I. Graffham. II. Billingshurst.

Galanthus nivalis L. Stream-sides near Graffham, looking like a native. I have never before seen such a satisfactory station in this part of England.

Polygonatum multiflorum All. I can confirm the old Graffham record; and Mr. Edgell informs me that a wood near Heyshott is full of it.

Allium ursinum L. Abundant by the stream between Lodsworth and Selham; wooded downs near Cocking, Heyshott, and Graffham.

Luzula Forsteri DC. Lavington; Petworth; Lodsworth, &c.—*L. Forsteri* × *vernalis* (*L. Borreri* Bromf.). Graffham; Midhurst; Lodsworth. — *L. maxima* DC. Copse and railway-banks east of Petworth Station, in plenty.

Typha angustifolia L. Barnett's Mill, between Selham and Lavington; pond by the railway, between Midhurst and Cocking.

Sparganium ramosum Curt. var. *microcarpum* Neum. II. Amberley Wild Brooks.—**S. neglectum* Beeby. Barnett's Mill; Bosham. —*S. simplex* Huds. II. Amberley Wild Brooks.

Lemna trisulca L. I. Sidlesham. II. Amberley. — *L. gibba* L. Sidlesham. — *L. polyrrhiza* L. I. Graffham; Birdham. II. Greatham.

**Wolffia Michelii* Schleid. II. Ditch, a little west of North Stoke Church; an interesting addition to the Sussex list.

**Alisma lanceolatum* With. Birdham and Earnley; near Sidlesham. A good subspecies, I believe.

Butomus umbellatus L. II. Amberley Wild Brooks.

Triglochin palustre L. Graffham; Pagham.

Potamogeton polygonifolius Pour. I. Graffham. II. Amberley Wild Brooks. — *P. alpinus* Balb. II. Pool near the Arun, above North Stoke. — *P. perfoliatus* L. II. In the Arun below Pulborough. — *P. interruptus* Kit. In the Rother, from Selham to Fittleworth.

Ruppia rostellata Koch, Salt pools, Pagham; Thorney.

Zannichellia pedunculata Reichb. Ditch near Clymping.

Zostera marina L. var. *angustifolia* Hornem. Thorney. — *Z. nana* Roth. Abundant about Bosham; Pagham, scarce.

Eleocharis acicularis R. Br. II. Ditch, Amberley Wild Brooks.

Carex pulicaris L. Graffham Common; Midhurst Common.—*C. remota* × *vulpina* (*C. axillaris* Good.). Aldwick; Earnley. — *C. acuta* L. I. Old Park, Lavington; Selham; Fittleworth. A peculiar form grows by the pond at Bignor Park, of which Pfarrer Kükenthal writes:—"No. 2610 is the form of *C. acuta* which I have designated as var. ε *sphærocarpa* Uechtr. At least it comes very near to that." II. Abundant by the Arun, between Pulborough and Amberley.—*C. pendula* Huds. I. Exceedingly plentiful on the gault from Graffham to Bignor. II. West of Horsham. —*C. strigosa* Huds. Jays Furze, Lavington, *Salmon* sp. — *C. laevigata* Sm. Swamp, south of Graffham Common; one luxuriant specimen was nearly 6 ft. high.—*C. binervis* Sm. Coates Common; Graffham Common. — *C. distans* L. In profusion near Pagham, towards Sidlesham and Selsey, together with plenty of *C. extensa* Good.—*C. Œderi* Ehrh. var. *œdocarpa* And. (*flava*, *minor*, Towns.). Lavington; Graffham.—*C. hirta* L. By a pond at Sutton Cottage, near Coates, the form with glabrous leaves and glumes (*C. hirtæformis* Pers.) is very marked at the water's edge; but it merges imperceptibly into the type, and is apparently a mere state. — *C. Pseudo-cyperus* L. Barnett's Mill. — *C. acutiformis* Ehrh. Burton Ponds; common, I believe, in the valley of the Rother.—*C. rostrata* Stokes. Burton Ponds. — *C. vesicaria* L. Pond, Bignor Park; Selham; Fittleworth.

Spartina Townsendi H. & J. Groves. Abundant at intervals from the head of Bosham Channel right round to Fishbourne, and in Thorney; unquestionably a true native. This has evidently been confused with *S. stricta*, which is very local; I have seen it

in two or three places near Bosham, and on the east side of Thorney, south of the church.

Homalocenchrus oryzoides Miégev. (*Leersia oryzoides* Sw.). II. The scarcer form with exserted panicles occurred by the Arun below Pulborough and near North Stoke; as well as at Amberley Wild Brooks, where this species is abundant.

Milium effusum L. Frequent in copses on the gault; Graffham; Lavington; Burton; Sutton.

Phleum arenarium L. Clymping Sands. *Alopecurus bulbosus* Gouan grows in a neighbouring salt marsh.

Polypogon monspeliensis Desf. At the north-west end of Thorney this occurs by some old clay-pits full of water, and covered with a dense growth of some algæ. The stems droop in September, and the seeds germinate on the surface of this mass, while still *in situ*; thus forming groups of semi-floating plants, which flower in this position the following year.

Apera Spica-venti Beauv. Sandy fields near Lower Barn, Lavington; and between Graffham and Heyshott.

Ammophila arundinacea Host. Clymping Sands; Aldwick to Pagham.

Avena pubescens Huds. Downs above Sutton, &c.; probably not uncommon. — *A. strigosa* Schreb. Littleton Farm, near Upwaltham; rather plentiful last summer in a cornfield.

Koeleria cristata Pers. Waltham Hill; Graffham Down. Frequent on the chalk hereabouts, I think.

Molinia varia Schrank. Ambersham, Graffham, Lavington, and Coates Commons.

Poa nemoralis L. Lodsworth; Graffham. — *P. pratensis* L. var. *cærulea* (Sm.). Exceedingly well-marked between Aldwick and Pagham.

Glyceria fluitans × *plicata* (*G. pedicellata* Towns.). Between Chichester and Birdham; Rother Valley, near Petworth. — *G. plicata* Fr. Bosham; Earnley; Birdham; Graffham; Petworth; Fittleworth, &c. — **G. declinata* Bréb. II. Pond near Greatham, towards Amberley. I am now satisfied that this is a good species, or subspecies, nearest to *G. plicata*, but distinguishable by its smooth sheaths, prostrate habit, glaucous hue (constant through the winter), &c.

Festuca rottbœllioides Kunth. Clymping Sands; Aldwick. — *F. ovina* L. var. *capillata* Hack. Coates Common, &c. — *F. pratensis* × *Lolium perenne* (*F. loliacea* Curt.). Meadow near Shopham Bridge.

Bromus secalinus L. var. *velutinus* (Schrad.). Barley-field, Lavington; introduced with the crop.—*B. commutatus* L. Native in meadows, Rother Valley; frequent in sown grass-fields on the lighter soils.

Agropyron acutum R. & S. In profusion about Pagham and Sidlesham (named on the spot by Mr. Linton); Earnley; Bosham. —*A. junceum* Beauv. Aldwick; Pagham; Clymping Sands.

Lepturus filiformis Trin. Bracklesham Bay, near Earnley; very fine. I have a specimen sixteen inches high.

Hordeum marinum Huds. Locally abundant between Sidlesham and Pagham; Selsey.

**Elymus arenarius* L. Between Aldwick and Pagham; in some quantity for a short distance, but it did not flower last year,

Asplenium Adiantum-nigrum L. Common on the sand. — *A. Trichomanes* L. Lavington; Graffham.

Lastræa Filix-mas Presl. var. *paleacea* Moore. In the beech-woods between Graffham and Upwaltham; uncommon.—*L. spinulosa* Presl. Graffham.

Ophioglossum vulgatum L. Meadow above the Rectory, Graftham.

Chara vulgaris L. var. *papillata* Wallr. Ditch near Clymping.

MOSSES OF CO. LIMERICK.

By Eleonora Armitage.

The mosses enumerated in the accompanying list were collected in the latter part of July and the first week in August, 1901. The gatherings were chiefly made in the northern part of the county, in the neighbourhood of the city of the same name. The localities explored included some woodland and a small bog and two low hills on the Thornfields estate; and a few other tracts of the rapidly diminishing bogland; a small ravine at Glenstal; some ground adjoining the river Maigue in the demesne of Adare Manor; the banks of the Mulkear river at Annacotty; and the left bank of the Shannon where it flows past the Hermitage demesne at the picturesque falls of Doonaas; the small volume of water at that season flowing between instead of over the rocks, and exposing much of the moss flora which is usually submerged.

The geological formation is mainly carboniferous limestone, but the two small hills, Knock Brack and Knock Sentry, are of basaltic rock. The time of year was unfavourable for mosses, except those growing on bogs; the season, too, was unusually dry.

The number of species and varieties met with amount to 107; and I am glad to acknowledge the kind help I have received in naming them from Mr. H. N. Dixon, Mr. E. C. Horrell, Mr. J. A. Wheldon, and the Rev. C. H. Binstead. I give localities for the less common species.

The only published list of mosses that I am aware of which deals with this county is a short one in the "Report on the Botany of South Clare and the Shannon," by Mr. S. A. Stewart (Proc. Roy. Irish Acad. 1890), which includes jointly species from the three counties of Clare, Limerick, and Kerry, and is therefore not available for comparison.

Sphagnum subnitens var. *flavescens* Warnst., c. fr., var. *versicolor* Warnst., c. fr., and var. *violascens* Warnst., c. fr. — *S. squarrosum* var. *imbricatum* Schimp. and var. *spectabile* Russ., c. fr. — *S. cuspidatum* var. *falcatum* Russ., c. fr., and var. *submersum* Schimp., c. fr. —*S. inundatum* Warnst.—*S. Gravetii* Warnst.—*S. rufescens* Warnst.

—*S. cymbifolium* Warnst., c. fr.—Var. *fuscoglaucescens* Warnst., c. fr., and var. *glaucescens* Warnst. — *S. papillosum* var. *normale* Warnst., c. fr. All on Thornfields Bog, except last, Nenagh Road Bog.

Catharinea undulata Web. & Mohr.

Polytrichum gracile Dicks., c. fr. Thornfields Bog. — *P. commune* L.

Ceratodon purpureus Brid.

Dichodontium pellucidum Schimp. Glenstal.

Dicranella heteromalla Schimp.

Campylopus flexuosus Brid.—*C. pyriformis* Brid., c. fr. Both on Thornfields Bog.

Dicranum Bonjeani De Not. Thornfields Bog. — *D. scoparium* Hedw.

Fissidens adiantoides Hedw. Shady wall on Knock Brack.—*F. taxifolius* Hedw.

Grimmia apocarpa var. *gracilis* Web. & Mohr. Wall, Knock Sentry.—*G. pulvinata* Sm.

Rhacomitrium heterostichum Brid.

Ptychomitrium polyphyllum Fürnr.

Hedwigia ciliata Ehrh. Knock Brack.

Tortula ambigua Angstr. Wall, Annacotty.—*T. muralis* Hedw. —Var. *rupestris* Wils.— *T. subulata* Hedw.—*T. lævipila* Schwaegr. *T. intermedia* Berk. Adare.

Barbula rubella Mitt. — *B. tophacea* Mitt. Annacotty. — *B. cylindrica* Schimp. Annacotty and in the Shannon. — *B. sinuosa* Braithw. Near the river at Annacotty, and near the Maigue, Adare.—*B. gracilis* Schwaegr. Adare.—*B. unguiculata* Hedw.

Weisia viridula Hedw.

Cinclidotus fontinaloides P. Beauv., c. fr. In Shannon; and by Mulkear river at Annacotty, curiously matted with luxuriant growth of innovations.

Encalypta streptocarpa Hedw. Walls, Adare village.

Zygodon viridissimus R. Br., c. fr. On trees by Shannon.

Ulota Bruchii Hornsch., c. fr.—*U. crispa* Brid., c. fr.—*U. phyllantha* Brid. All Thornfields Wood.

Orthotrichum saxatile Milde, c. fr. Knock Sentry. — *O. cupulatum* Hoffm., c. fr. Walls, Thornfields. — Var. *nudum* Braithw., c. fr. Walls near river, Annacotty. — *O. affine* Schrad., c. fr.—*O. pulchellum* Sm., c. fr. Thornfields Wood.

Funaria hygrometrica Sibth.

Aulacommium palustre Schwaegr.

Philonotis calcarea Schimp. "Aquatic form" in Shannon (H. N. D.).

Bryum bimum Schreb., c. fr. Thornfields Bog. — *B. pseudotriquetrum* Schwaegr. Garden-hill Bog. — *B. cæspiticium* L.—*B. capillare* L. — *B. murale* Wils., c. fr. Wall, Thornfields.—*B. argenteum* L. On Annacotty Bridge.

Mnium undulatum L.—*M. hornum* L.

Fontinalis antipyretica L. A large, handsome form, approaching the var. *gigantea*.—*F. squamosa* L. Both in Shannon at Hermitage.

Cryphæa heteromalla Mohr., c. fr. Trees, Thornfields Wood, Knock Brack.

Neckera crispa Hedw. — *N. complanata* Hübn., c. fr. Glenstal, and fruiting on a shady wall of the ruined Franciscan Abbey, Adare.

Pterygophyllum lucens Brid. Glenstal.

Porotrichum alopecurum Mitt. Under water in Shannon.

Leskea polycarpa Ehrh.

Anomodon viticulosus Hook. & Tayl.

Thuidium tamariscinum B. & S., c. fr. — *T. recognitum* Lindb. Thornfields Bog.

Climacium dendroides W. & M. Thornfields Bog, and in Shannon at Hermitage.

Pleuropus sericeus Dixon.

Brachythecium rutabulum B. & S. — *B. rivulare* B. & S. The bright green form of this moss grew in the Mulkear river at Annacotty; but in the Shannon there was a very different-looking moss with deeply plicate leaves, short robust growth, whitish yellow above, and brownish green below.—*B. populeum* B. & S.—*B. purum* Dixon.

Eurhynchium prælongum B. & S.—*E. tenellum* Milde. Franciscan Abbey walls, Adare.—*E. circinatum* B. & S. Shannon banks, near river Maigue, Adare; in both localities this moss had the loosely-curled habit and dull yellowish colour which make it almost indistinguishable to the naked eye from *Pseudoleskea atrovirens* B. & S.; a specimen gathered at Killarney was bright green, and grew in a dense flat tightly-curled mat.—*E. striatum* B. & S., c. fr.—*E. rusciforme* var. *atlanticum* Brid. A large, handsomely-coloured variety in the Shannon.—*E. murale* Milde. Wall, Thornfields.

Amblystegium serpens B. & S. — *A. varium* Lindb. Adare; very rare in Ireland. — *A. filicinum* De Not. Damp wall, Thornfields. —Var. *Vallisclausæ* Dixon. In Shannon.

Hypnum riparium L., c. fr.—*H. aduncum* forma *gracilescens* Ren. This rare variety is small and slender, soft, yellowish green; the leaves have very short wide cells; it grew in the shallower holes, Thornfields Bog. — *H. fluitans* L. — *H. exannulatum* var. *pinnatum* Boul. f. *stenophylloides* Ren. (*fide* J. A. Wheldon). Thornfields Bog. —*H. commutatum* Hedw. Under water in the Shannon rapids, a stout dark green form with lighter tips, submerged, denuded at base, encrusted with calcareous mud. — *H. cupressiforme* L. — Var. *resupinatum* Schimp. — Var. *tectorum* Brid. Walls, Knock Sentry. —*H. palustre* L., c. fr. In Shannon, Hermitage. There were several forms of this variable moss, among the more distinct being—(1) a handsome form, in compact tufts, not denuded, with julaceous branches, leaves dark olive-green below, reddish amber at the top of the stems; (2) a green, scarcely denuded form, with bright green falcate secund tips; (3) a form with broader, laxer branches, denuded at base, brownish amber; (4) a form with black, longly denuded branches with dull orange-brown or greenish brown tips, in large straggling masses, and fruiting.—*H. cordifolium* Hedw. Bogs.—*H. cuspidatum* L., c. fr.

Hylocomium splendens B. & S.—*H. squarrosum* B. & S.—*H. triquetrum* B. & S.

BRITISH HAWKWEEDS OF THE *CERINTHOIDEA* GROUP.

By Frederic N. Williams, F.L.S.

It is to be regretted that the assiduous workers who have expended so much enthusiasm in the detailed examination and critical investigation of the British Hawkweeds have not seen their way to define in precise terms the various sections in which the multifarious and variable British forms may be grouped. The comparison of a series of Scottish specimens with an assortment of specimens collected in similar stations in the mountainous districts of Central Europe, would doubtless show that many forms now considered dimotospecific would be found to be conspecific. And were the sections to which these many forms may be referred succinctly defined, it would certainly lead to a satisfactory reduction of species, as welcome to the field-botanist as to the systematic compiler.

Syme, in his account of the species included in the third edition of *English Botany*, implicitly followed the views expressed in Backhouse's monograph, and complacently remarks, "I do not venture to quote continental authorities, as in many cases they do not divide the species in the same way as Mr. Backhouse." Fortunately, perhaps, for the plodding systematists, they do not. And further, a critical examination of a series of Continental forms would probably tend to show that constituent species are not to be considered endemic to a greater extent and in a greater degree than is the case in other genera whose concrete units are so protean in character.

The critical methods of Nägeli and Peter, of Burnat and Gremli, and of A. Neilreich, deviate considerably from the lines laid down by Fries, and part issue in the value they assign to groups of characters. In a revision of British *Compositæ* it becomes necessary to compare the subdivisions of groups within the family or the genus, as carried out in the floras of other countries, in which the plants of a definite area are enumerated, an area which, owing to political exigencies, is more often artificial and unnatural in its boundaries. The comparison emphasizes the existence of insular prejudices in the maintenance of a pre-evolutionary scheme of classification. The admirable set of British Hawkweeds issued by Messrs. Linton, exhibiting almost a complete series of British forms carefully collected and mounted, offer an excellent opportunity for comparison of European specimens, and the collation of their descriptions in Continental floras.

Among the British species of *Hieracium* which do not bear stolons, the *Cerinthoidea* may probably be considered as the highest group. The headquarters of this group are from the Cevennes to the Pyrenees. To include what appears to be a natural series of specific forms, it may be defined in the following terms:—

Cerinthoidea *Koch*, Syn. fl. Germ. Helv. ed. 2, ii. p. 520 (1844); Syn. Deutsch. Schw. fl. aufl. 3, p. 1773 (fasc. 12, 1898); *Engl. & Prantl*, Natürl. Pflanzenf. iv. abt. 5, p. 377 (1894).

Rhizoma ad collum piloso-cristatum. Caules sæpe breves, scapiformes vel paucifoliati, oligocephali glanduloso-pilosi. Folia tenuia valde glauca, oblonga vel elliptica, pilis elongatis villosa, et ad petiolum barbato-hirsuta; pilis sæpe denticulatis nunquam plumosis. Calathia mediocriter majuscula. Receptaculi alveoli ciliati. Periclinii squamæ numerosæ regulariter imbricatæ, spiraliter seriales, haud latæ, interiores plusminus acutæ, parce pilosæ sed glandulosæ. Ligulæ speciosæ luteæ vel flavæ, apice ciliatæ, ciliis breviter articulatis.

The group may be said to include three British species,—*H. callistophyllum* Hanbury, *H. anglicum* Fries, and *H. iricum* Fries.

In the last edition of the *London Catalogue* nine species are enumerated as belonging to this group, nos. 917–925 inclusive. From a comparison of the descriptions with the specimens, the latter five should, I think, be transferred to the *Oreadea* or *Vulgata* group. In *H. Clovense*, for instance, the blotched leaves are scarcely glaucous, the scales of the involucre are broad with a velvety indumentum, and the ligules are not ciliated at the tip. In spite of the statement of Mr. Hanbury in *Journ. Bot.*, 1892, p. 169, I think that many field-botanists will consider *H. cerinthiforme* as merely a form or variety of *H. anglicum*, under which it was first placed by Backhouse. This was the plant described by Syme as *H. anglicum* var. *decipiens*, which is a misleading name; as in De Candolle's *Prodromus*, vii. p. 230, Frölich relates that *H. decipiens*—i.e. *H. cerinthoides* var. *decipiens* Monnier—is the *H. cerinthoides* of English floras. Seven British varieties of *H. anglicum* have been described:—

α genuinum *Syme*, Engl. Botany, ed. 3, v. p. 180, t. 836 (1866).
β acutifolium *Backh.*, Monogr. Brit. Hierac. p. 37 (1856).
γ jaculifolium *Hanbury*, in Journ. Bot., 1892, p. 168.
δ longibracteatum *id.*, in Journ. Bot., 1889, p. 75.
ε calcaratum *Linton fratt.*, in Journ. Bot., 1901, p. 105.
ζ amplexicaule *Backh.*, in *Bab.* Man. Brit. Bot. ed. 5, p. 203 (1862).
η Hartii = H. cerinthiforme *var.* Hartii *Hanbury*, in Journ. Bot. 1892, p. 169.

In grouping the British species of the subgenus *Archieracium*, it is proposed to arrange them under ten sections in two series: (1) *Phyllopoda* and (2) *Aphyllopoda*, as defined by Godet and somewhat modified by Celakovsky. These are preferable to the artificial groups of *Aurella*, *Pulmonarea*, and *Accipitrina*, proposed by Fries. The Phyllopodous series are divided into the two subseries of *Trichophylla* and *Adenophylla*, on the character of the leaves, whether glaucous and invested with simple non-glandular hairs, or green and invested with glandular hairs. The arrangement proposed by Adolph Scheele in *Linnæa*, xv. (1862), of grouping the species of *Archieracium* in two primary series of *Trichoclinica* and *Gymnoclinica*, on the character of the presence or absence of hairs in the pits of the common receptacle, is not one that works out very well.

HELIANTHEMUM BREWERI, Planch.

By G. Claridge Druce, Hon. M.A., F.L.S.

The plant bearing the above name was discovered by Samuel Brewer at Holyhead in 1726. The following note is copied from Solander's transcript of Brewer's "Botanical Journey through Wales," which is preserved in the National Herbarium:—"Aug. 5. [1727]. Received from the reverend Mr. Green the undermentioned plants, taken from the same places in Anglesea as we did the last year, but now in a better state, tho' not in a good one, being too far gone, especially the *Helianthemums* (the lesser *Cistus*); Hedge or dwarf Hyssop; wild Rush; little seed flower; 3 or 4 sorts of *Limoniums* (Sea Lavender). The small annual *Helianthemum* from Holyhead Mountain, which is allmost covered over with it, and a good quantity of seed from it. it grows in great plenty on the South End of the Ridge of the Mountain, whereon stand the Ruins of an old Chappel. N.B.: it is that part of the Mountain that lyes remotest from the Town of Holyhead, to the S.W. or thereabouts. In this part of the mountain, there is a large standing pool of water, seldom or never dry; and if you walk upon the highest part of the Mountain W. of this pool, till you come to the South end of it, you can not miss the plant; The mountain that it grows upon is called *Llechdda*, which lyes between the Sea and the Lake called *Llyn Mawr*, and the greatest plenty grows upon the highest part, where there is a heap of stones partly walled in the form of a Circle."

It would appear that Brewer had the previous year sent seeds of the plant to Sherard, for in the letter of Dillenius to Brewer (also in the National Herbarium) we find one written Aug. 27, 1727, in which the following passage occurs:—

"Out of your seeds Mr. Sherard had one plant of y^e^ Helianthemum but did not flower this year and is now a going of. Y^e^ leaf looked very like to y^e^ Cistus flore pallido &c. Syn. p. 342: this hath a pale yellow flower with a dark purple spot on each petalum in y^e^ middle, a leaf like a plaintain and hairy. I hope you have seen and gathered it in a good state."

In the Dillenian herbarium at Oxford there is a specimen of "Mr. Brewer's Helianthemum from Anglesey," doubtless given by the collector to Dillenius.

The first published account is in Hudson's *Flora Anglica* (ed. ii. p. 232, 1778) as *Cistus guttatus*. Curtis (*Flora Londinensis*, fasc. v. t. 33) figures under the same name a bracteate and spotted-petalled plant, which may be a garden specimen. But he does not tell us whether it is wild or cultivated, and he alludes to the Isle of Man as a locality, evidently mistranslating "Insula Mona" into that name, in which he is followed by Smith (E. B. t. 544), who says he is "obliged, like Mr. Curtis, to have recourse to a garden" specimen, owing to the fugacious character of the petals. The figure represents an ebracteate, spotted-petalled plant, but, like

that in the *Flora Londinensis*, is almost certainly not of Welsh origin, as the leaves are longer and more acute. In the British Museum there are the following MS. notes referring to the localities of *H. Breweri*, the first by Sir Joseph Banks, the other by the Rev. H. Davies:—

"Anglesey. Gadar in the Parish of Llanvair in Cornwey [*sic*] at the north end of the Island facing the Skerries about half a mile from the sea upon the rocks where the soil is not deep, among the Scilla bifolia and Sedum rubens: it flowers in June. Mr. Williams": "Cistus guttatus Fl. Brit. Holyhead Mountain and Amlwch, i.e. N.W. of the village among Heath, before the discovery of the great copper mine, plentifully. H. Davies."

In Hooker's *London Journal of Botany* (iii. 618, 1844) Planchon describes the Anglesey plant as a new species of *Helianthemum*, which he calls *H. Breweri*. He diagnoses it as follows:—"Helianthemum (e sectione *Tuberaria*) annuum a basi ramosum subdiffusum viscidulo-hispidulum, pedicellis bracteatis, defloratis subdeflexis, fructiferis erecto-patentibus, petalis angustis immaculatis, staminibus 8–12, seminibus quam in H. guttato majoribus." "The straggling mode of growth, with short, numerous and dichotomous bunches of flowers, the existence of bracteas even to the upper flowers, and of pedicels, which at first slightly bend down, but rise up when the fruit is ripe and stand at an angle of forty-five degrees to the axis of the cluster, such were the characters, which at a first glance suggested the idea that the plant was specifically distinct from *H. guttatum*." The presence of bracts is, he says, constant in cultivation, as shown in the figure taken by Mr. Wilson from a cultivated example; and he considered the Anglesea plant specifically different from the French *guttatum* with which he was well acquainted.

Syme (Eng. Bot. ed. 3, vol. ii. p. 8) treats *H. Breweri* as a subspecies of *H. guttatum*, "the chief point of difference being the presence of strap-shaped leafy bracts at the base of the pedicel." Under *H. guttatum* he says the Jersey plant has the leaves with stellate pubescence and ebracteate.

In 1890 I visited the Anglesey locality near Holyhead, and found plants having the bracteate flowers of *H. Breweri*, but with them were more luxuriant specimens, quite *ebracteate*; on my return I submitted them to Mr. J. G. Baker, who named them "typical *guttatum*." I reported this in this Journal for 1890 (p. 315), but pointed out that the leaves were broader than those on the Jersey plant, and in the Report of the Bot. Exch. Club for 1892, p. 355, I stated that I thought it was ebracteate *H. Breweri*. In his *Flora of Anglesey and Carnarvon*, p. 17, Mr. Griffith says "I have sown seeds of the supposed *H. guttatum* and seeds of undoubted *H. Breweri* from the same place in rich soil in my garden, with the result that they all turned out to be the same—viz. *H. Breweri*."

From the foregoing statements we see that the characters given to *H. Breweri* both by its original describer and subsequent writers will need amending; as those of bracteate inflorescence, diffuse growth, and unspotted petals given by Planchon are found to be

inconstant. The larger number of specimens seen by me in 1890 and 1894 had spotted petals, and were erect, and a few of the larger and more upright plants were quite ebracteate. Still, the Anglesey plant has a different facies from the *H. guttatum* of Jersey, the leaves being broader and more obovate, and of a more coriaceous texture, but they have stellate hairs on the under surface, a character mentioned by Syme for *H. guttatum*, but not referred to him under *H. Breweri*, and I think it to be a good geographical race.

I may add that *H. Breweri* is also found at Three Castle Head, Co. Cork, and in Inishboffin and Inishark (see Cyb. Hib. ed. 2, p. 41), and *H. guttatum* is also said to grow in both localities. I have seen no Irish specimens of the latter plant, but I am assured that both occur. It would be interesting to see if the Irish is precisely identical with the Jersey plant.

SHORT NOTE.

Nomenclature of Strophanthus.—On p. 161 of the last number (xxxii. pt. i., 2 May) of the *Botanische Jahrbücher* Dr. E. Gilg raises to the rank of a species a *Strophanthus* which had previously been considered as of varietal rank, and adopts what he supposes to be the earlier of two varietal names which had been bestowed upon the plant. His entry runs as follows:—

"S. grandiflorus (N. E. Brown) Gilg.

"*Strophanthus Petersianus* var. *grandiflorus* N. E. Brown in Kew Bull. (1892) p. 126; Hooker f. in Bot. Magaz. t. 7390.

"*S. sarmentosus* var. *verrucosus* Pax in Engler's Bot. Jahrb. xv. (1893) p. 374; Franchet in Nov. Arch. du Muséum, 3 ser. v. (1893) p. 284."

The year assigned to first publication is in each case taken from the title-page of the volume in which the names appear; and it does not seem to have occurred to Dr. Gilg that that further investigation was necessary. In Beiblatt no. 61 appended to vol. xxvi. of the *Jahrbücher* will be found a list of the dates at which each part in the first twenty-five volumes was published; from this it will be seen that p. 374 of vol. xv. is included in the part published June 10, 1892. Even then, however, it might seem that Mr. Brown's name would claim priority, as the number of the *Kew Bulletin* in which it appeared bears on its front the date "May and June, 1892": but at the foot of the page will be found the tell-tale Stationery Office date "7/92," showing that the number was not actually published before July—it may of course have been later, for the issue officially dated "10/99" was not issued to the public until August, 1901. Dr. Pax's name, therefore, has undoubted priority; it remains to be seen whether those who insist on the permanence of even varietal names will substitute it for *S. grandiflorus*.—James Britten.

*ARTICLES IN JOURNALS.**

Annals of Botany (March).—S. H. Vines, 'Trytophane in Proteolysis.'—W. H. Lang, 'Prothalli of *Ophioglossum pendulum* and *Helminthostachys zeylanica*' (3 pl.).—G. Massee & E. S. Salmon, 'Coprophilous Fungi' (2 pl.).—S. O. Ford, 'Anatomy of *Ceratopteris thalictroides*' (1 pl.).—C. S. Gagar, 'Development of pollinium and sperm-cells in *Asclepias Cornuti*' (1 pl.).—W. T. Thiselton-Dyer, 'Morphological Notes' (2 pl.).—A. G. Tansley & R. B. Lulham, 'New type of fern-stele.'—A. P. W. Thomas, 'An alga-like fern-prothallium.'

Botanical Gazette (22 March and 18 April).—F. C. Newcombe, 'Rheotropism of Roots.'—A. Eastwood, 'Plants collected at Nome City, Alaska.'—(22 March).—J. G. Hall, 'Embryological study of *Limnocharis emarginata*.'—C. L. Shear, 'Generic Nomenclature.'—W. W. Ashe, 'Some American Trees.'—(18 April).—J. Donnell Smith, 'Undescribed plants from Guatemala' (2 pl.).

Botanical Magazine (Tokyo: 20 Feb.) and 20 March).—Yubuki, T., 'Plants of Mimasaka' (cont.).—T. Makino, 'Flora of Japan' (cont.).—(20 Feb.).—J. Matsumura, 'Rare plants in Japan.'—(20 March).—J. Matsumura, 'Leguminosæ of Japan.'

Botaniska Notiser (1 April).—N. Wille, 'Norsk botanisk Litteratur 1891–1900.'—G. Lagerheim, 'Metoder für pollenundersökning.'—G. Andersson, 'Trenne für Sverige nya växtarter' (*Equisetum maximum* & *Nymphæa tetragona*) (?).—(5 May).—F. Swanlund, 'Bidrag till Kannedomen om Blekinges Hieraciumflora.'—E. Haglund, *Eriophorum aquatile.*

Bot. Zeitung (16 March).—H. Molisch, 'Ueber localen Blutungsdruck und seine Ursachen.'—(16 April).—A. Hassenkamp, 'Ueber die Entwickelung der Cystocarpien bei einigen Florideen (1 pl.).

Bull. de l'Herb. Boissier (27 March).—A. Cogniaux, *Epidendrum biflorum* sp. n.—H. Schinz, 'Zur Kenntnis der Schweizerflora.'—H. Christ, 'Spicilegium pteridologicum austro-brasiliense' (cont.).—R. Chodat, 'Plantæ Hasslerianæ' (cont.).—T. Herzog, *Racomitrium tortuloides* sp. n.—J. Grnitzesco, 'Physiologie de *Scenedesmus acutus*' (concl.): 3 pl.).—(30 April).—F. Renault and J. Cardot, 'Mousses des Canaries' (2 pl.).—F. Stephani, 'Species Hepaticarum' (cont.).—R. Chodat & E. Wilczek, 'Contributions à la Flore de la République Argentine.'—J. Briquet & Joseph Timothée (1823–1900).

Bull. Soc. Bot. France (xlix, 1, 2: 26 March).—J. Daveau, '*Helminthia spinosa*.'—F. Gagnepain, 'Zingiberacées nouvelles' (*Renealmia*).—L. Legré, 'L'Ellébore massaliote de Théophraste.'—J. Hervey, 'Des arbres à caoutchouc de la région de l'Amazone'—P. Flicher, 'L'épiphytisme du *Polypodium vulgare*.'—P. Guérin, *Boissiera bromoides.*

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* The dates assigned to the numbers are those which appear on their covers or title-pages, but it must not always be inferred that this is the actual date of publication.

Bullettino della Soc. Bot. Italiana.—'Guiseppe Camillo Giordano' (1841–1901).—N. Passerini, 'Sopra la vegetazione di alcune piante alla luce solare diretta e diffusa.'

Bull. Torrey Bot. Club.—P. A. Rydberg, 'Rocky Mountain Flora' (24 March & 24 April).—(24 March).—L. M. Underwood, American *Aspidieæ.*—E. M. Kupfer, '*Urnula* & *Geopyxis*' (1 pl.).—E. B. Copeland, 'Conjugation of *Spirogyra crassa.*'—D. Griffiths, 'A novel Seed Planter (*Plantago fastigiata*).'—A. A. O'Brien, 'Resistance of certain fungi to high temperatures.'—G. E. Osterhout, '*Hesperaster nudus.*'—(24 April).—E. S. Salmon, 'Notes on *Erysiphaceæ*' (3 pl.).—M. T. Cook, 'Embryo-sac and embryo of *Castalia odorata* and *Nymphæa advena.*'—C. V. Piper, 'Noteworthy North-western Plants.'—J. C. Arthur, 'New *Uredineæ.*'

Gardeners' Chronicle (10 May).—A. Henry, 'The wild forms of the Chrysanthemum' (figs. 93, 94).

Journal de Botanique (March).—L. Guignard, 'Les *Daniellia* et leur appareil sécréteur.'—Le Renard, 'Action des sels de cuivre sur le *Penicillium glaucum.*'—A. de Coincy, 'Espèces critiques du genre *Echium.*'—(April).—P. Van Tieghem, 'Subdivision du genre *Ochna*' (*Ochnella*), *Perochna*, *Discladium*, genn. novv.).—E. Bornet, 'L'herbier de Lamarck, son histoire, ses vicissitudes, son état actuel.'—F. Guégnen, 'Anatomie du style et du stigmate des Phanérogames.'

Journ. Linn. Soc. (xxxv. 244: 1 April).—N. E. Brown, 'Revision of *Hypericophyllum* (1 pl.).—W. B. Hemsley, 'Flora of Tibet or High Asia' (map).

New Phytologist (19 Ap. & 16 May).—V. H. Blackman, 'Recent work on hybrids.'—F. F. Blackman & A. G. Tansley, 'Revision of Classification of Green Algæ' (cont.).—(16 May).—E. Sargant, 'Origin of seed-leaf in Monocotyledons.'

Nuovo Giorn. Bot. Ital. ("Gennaio"; received March).—L. Buscaloni, 'Il progetto d'impianto di un Istituto botanico internazionale nell' Amazonia.'—E. Pons, 'Revista critica delle specie italiane del *Atriplex.*'—F. Cavorra, 'Resistenza fisiologica del *Microcoleus chlonoplastes* a soluzioni anistoniche' (1 pl.).—P. Baccarini, 'Appunti sulla anatomia delle Epacridee' (1 pl.).

Oesterr. Bot. Zeitschrift (April & May).—R. Wagner, '*Roylea elegans.*'—(April).—H. Sabransky 'Zur Flora von Tirol.'—A. Jenčic, 'Der Bastfasern der *Thymelæaceæ.*'—J. Velenovský, 'Plantæ novæ bulgaricæ.'—J. Freyn, 'Plantæ Karoanæ' (cont.).—A. Plitska, 'Zur Teratologie der Compositen' (1 pl.: concl.).—F. Bubák, 'Einige Compositen bewohnende Puccinien' (concl.).—May. A. T. Schmidt, 'Anatomie von *Cassytha filiformis.*'—J. v. Sterneck, 'Zwei neue *Alectorolophus*-Arten.'—H. P. Sydow, 'Einige neue Uredineen.'—E. Hackel, 'Neue Gräser.'—A. Wildt, 'Ueber die Euphrasien Mährens.'—V. v. Borbás, '*Primula brevifrons.*'

Rhodora (April).—B. L. Robinson, '*Polygonum* § *Avicularia*' (1 pl.).—A. Andrews, '*Habenaria hyperborea.*'

BOOK-NOTES, NEWS, &c.

The Report of the Proceedings of the Liverpool Naturalists' Field Club for 1901 contains an address on "the Fungi" by the President of the Club, Dr. C. T. Green, followed by "a preliminary index of local fungi, mainly from Wirral." Dr. Green sends us a specimen sheet of the new Liverpool Flora, which will be published in about three months; it presents a noteworthy innovation in that each species is figured, in most cases from plants growing in the district. The figures are carefully drawn and characteristic, but it is to be regretted that no dissections are given; there should also, we think, be some indication as to scale—in the pages before us there is nothing to indicate to the novice that *Sempervivum* and *Drosera rotundifolia* (which stand side by side) are not of the same height. The book will certainly be cheap at 5s.

The Report mentions the death of Robert Brown, who was born at Liverpool on the 27th September, 1839, and died there on the 6th April, 1901, of whom Dr. Green sends us the following particulars. In 1870 he became a member of the Liverpool Naturalists' Field Club, of which he was afterwards botanical referee (for over twenty years) and president (1896 to 1898). He took an active part in the revision of that Society's "Flora of Liverpool," the second and third Appendices to which were entirely edited by him. He also energetically assisted the late Lord de Tabley in collecting material for the present "Flora of Cheshire," these services being gratefully acknowledged in a voluminous correspondence. Brown next turned his attention to a projected Flora of Flintshire, for which he collected many notes during holiday rambles in that county, but through failing health and lack of support the project was abandoned. Some notes on Flint plants from his pen will be found in this Journal for 1885, pp. 357–360.

The great *Cyclopedia of American Horticulture*, edited by Prof. L. H. Bailey (Macmillan & Co.), previous instalments of which have been noticed in these pages, is now completed by its fourth volume. To this the editor prefixes an interesting account of the inception and execution of the work, written in the characteristic and attractive style which distinguishes his literary work. The book will take rank as a standard work of reference on horticulture, and should not be overlooked by botanists, as the botanical part, with which alone we are concerned, is evidently very carefully done. From the table of "statistics" we learn that the volumes contain 4357 articles, 2255 genera and 8793 species being fully described, in addition to about the same number of varieties and species incidentally mentioned.

We have received the second part of Dr. Theodore Cooke's *Flora of the Presidency of Bombay*, in which the enumeration is carried on from *Simarubaceæ* to the end of *Leguminosæ*. Sir George King gave a full account of the plan and scope of the work in our last year's volume (p. 392), and it is only necessary to call attention to its steady progress, which it is to be hoped will be maintained

until the Flora is completed: the undertaking of an individual, although more arduous, is not so liable to hindrances as are works by several hands, or those which, like certain colonial floras, are of an official or quasi-official nature. Three new species—*Vitis Woodrowii* Stapf MS., *Eleiotis trifoliolata* T. Cooke, and *Flemingia nilgiriensis* Wight MS.—are described, and *Indigofera Dalzellii* supersedes *I. triquetra* Dalz. non L. We note that Dr. Cooke restores the correct spelling—*Chukrassia*—of the name often printed *Chickrassia*, but somewhat inconsistently retains *Sesbania* in preference to the earlier *Sesban*. The notes—*e. g.* that on *Buchanania Lanzan* (p. 276)—show much care and research, and the book is a scholarly and useful addition to our list of colonial floras. The date of publication should be placed on each part.

George Samuel Jenman was born in the south of England on Aug. 24, 1845. His family shortly afterwards went to the south of Ireland, where he was educated. He went to Kew as a young gardener, and remained there until 1873, when he was appointed to the charge of the botanical gardens at Castleton, Jamaica. In 1879 he became superintendent of the botanic garden at Georgetown, British Guiana, which post he continued to fill in an eminently satisfactory manner till the time of his death. While in this position, he was of course largely occupied with developing economic resources, but he found time for various excursions, during which he made large collections of plants, both phanerogams and ferns, containing many novelties which have been described by various botanists. His principal botanical work, however, was among the ferns, of which he greatly enlarged our knowledge. His first paper upon them—a Supplement to the Jamaican Ferns, recorded in Grisebach's *Flora of the West Indies*—was published in this Journal for 1877, pp. 263–6, with additions in 1879, and in 1881, in which year he issued a "hand-list" of the ferns of the island: to this the paper on "Jamaica Ferns" in this Journal for 1882 (pp. 323–27) is an appendix. From this time onward he published numerous descriptions of new species in this Journal and in the *Gardeners' Chronicle*. In 1898 he began in the *Bulletin* of the Trinidad Gardens an important enumeration, with descriptions, of the ferns of the British West Indies and Guiana; this unfortunately remains incomplete, and it will be long before any one so thoroughly competent will be found to bring it to a conclusion. Jenman did not content himself with describing novelties or working up recent material; during his visit to this country in 1885, he went carefully through the ferns of Sloane's herbarium, of which he published an enumeration in this Journal for 1886; and he similarly identified and published a list of the ferns figured by Plumier in his *Tractatus de Filicibus Americani*. He died at Georgetown on February 28.

Part III. of the third volume of Mr. Medley Wood's *Natal Plants*, which has just appeared, comprising Plates 251–275, represents plants of very various natural orders. Among others we notice *Aloe natalensis* Wood & Evans (Plate 258), a description of which will be found in this Journal for last year (p. 170) in a reprint from Mr. Wood's Report of the Natal Botanic Gardens.

We learn from the daily press that a new botanical post has been created, which will be filled by Sir W. Thiselton-Dyer, who, it is said, will retire next year from the directorate of Kew Gardens. We take the following from the *Daily Chronicle*:—"Sir William Thiselton-Dyer, who now becomes 'Botanical Adviser' to the Colonial Secretary of State, has been Director of the Royal Gardens at Kew for the last seventeen years. He began his working career at the Royal Agricultural College at Cirencester in 1868, when he was twenty-five, but he wrapped himself up in Kew in more senses than one when he married the accomplished daughter of Sir Joseph Hooker, who was Director of the famous 'Gardens' from 1855 to 1865. Like his distinguished father-in-law, Sir William has contributed largely to the literature of botanical science, and there is probably much more yet to come from him, for he is a very young man for his years." It can hardly be said that the literary contributions of the present Director, so far as these are enumerated in the 'List of Kew Publications' reviewed in this Journal for 1897 (pp. 100–103) are comparable either in number or quality with those of "his distinguished father-in-law"; but it may be that his comparative leisure will result in the production of work which will take rank with that of Sir Joseph Hooker.

The Journal of the Linnean Society dated April 1 (xxxv. no. 244) contains an important paper by Mr. Hemsley on "The Flora of Tibet and High Asia; being a consolidated account of the various Tibetan botanical collections in the Herbarium of the Royal Gardens, Kew, together with an exposition of what is known of the Flora of Tibet."

Part xxi. of Dr. Braithwaite's *British Moss-Flora* (London: 26, Endymion Road, Brixton Hill. Vol. iii, pp. 129–168; plates cix–cxiv. Price 6s.) brings that notable work near to its completion, for only two more parts remain to be issued. The present one, which appeared in April, gives us the two final genera of the *Hypneæ*, viz. *Helicodontium* and *Habrodon* (each with one species), and includes most of the *Stereodonteæ*, viz. the genera *Myurella* (two species), *Heterocladium* (two), *Hylocomium* (nine), *Campylium* (two), *Ctenidium* (two), *Hyocomium* (one), *Ptilium* (one), *Sematophyllum* (two), and *Stereodon* (twelve, unfinished). Among the rarer species are *Myurella tenerrima*, *Hylocomium pyrenaicum*, *Ctenidium procerrimum*, *Stereodon Bambergeri*, and *S. revolutus*. The differences between the closely allied species *S. canariensis* and *S. circinalis* are made clear in the text and plates. *Hypnum Sommerfeltii* is ranged as a variety under the exotic *Campylium hispidulum*. The Lindbergian system of nomenclature, which the author follows, leads to the concealment of the well-known *Hylocomium splendens* and *H. Schreberi* under the unfamiliar and confusing names *H. proliferum* and *H. parietinum*.

Parts 2, 3, and 4 of Dr. W. Migula's new German Cryptogamic Flora, which forms the fifth volume of Thomé's *Flora von Deutschland, Osterreich und der Schweiz* (Gera, Reuss j. L.: F. von Zezschwitz), advance the work from p. 33 to p. 128, and contain plates

5–27. Several of the plates are coloured, and the figures all appear to be truthfully rendered. They chiefly serve to illustrate the diagnostic characters employed in the keys to the species, which form an important feature of the book. The descriptions are short and simple; and the system of classification is the well-known one elaborated by Limpricht in his *Laubmoose*. The present parts are concerned chiefly with the *Andreæaceæ*, *Cleistocarpeæ*, *Weisiaceæ*, *Dicranaceæ*, and *Pottiaceæ*. The work promises to be of great assistance to those who can read German; but it is to be regretted that certain errors of spelling should have escaped correction. Thus we note *Ortothrichaceæ* (p. 45), *osnumdioides* (p. 81), *Wanstorfii* (p. 105), *acciphylla* (p. 121), *acyphylla* (p. 127). These errors catch the eye the more readily from being printed in a conspicuous leaded type.

At the meeting of the Linnean Society of London, on April 17th, Mr. A. C. Seward read a paper by Miss S. O. Ford and himself, "On the Anatomy of *Todea*, with Notes on the Affinity and Geological History of the Osmundaceæ." The main points were: (1) the investigation of the anatomical structure of *Todea* as represented by *T. barbara* and two of the filmy species, *T. superba* and *T. hymenophylloides*, with a view to a comparison with that of *Osmunda*; (2) a summary of the geological history of the Osmundaceæ and Osmundaceous characters; and (3) the question of the interpretation of the stelar structures of *Osmunda* and *Todea*. *Todea barbara* agrees in most respects with *Osmunda regalis* in anatomical features; in *T. superba* and *T. hymenophylloides* the protoxylem is mesarch, and occasionally almost exarch. In *T. hymenophylloides* the authors found an inner endodermis in the stem, characterized by its sporadic manner of occurrence; in the seedling stem no trace of an inner endodermis was detected. The authors expressed themselves in favour of regarding the stele of the Osmundaceæ as a medullated monostele, and were unable to agree with the interpretation recently put forward by Dr. Jeffrey and Mr. Faull.

Old-Time Gardens, by Alice Morse Earle, is an extremely pretty and charmingly illustrated book produced by the Macmillan Co. in New York, and published over here by their representatives. It has a distinctive character by which it is separated from the crowd of books about gardens which have been produced during the last three or four years, for it deals mainly with American flowers and American gardens, and the illustrations are largely taken from photographs of these. There is a good deal of popular lore and of information which, although not strictly botanical, is of interest to plant-lovers, who will find this a pleasant and readable book.

The Moss Exchange Club Report for 1902 has recently been issued, and bears evidence of much activity on the part of the members. The Club now consists of forty members, who sent in during the last year over three thousand packets of mosses and hepatics for distribution, all of which were examined and the naming confirmed by seven of the older members of the Club who

acted as referees. The report is somewhat less interesting this year than in previous years, having been cut down considerably to reduce the expense of printing, as well as from the fact that fewer critical plants requiring discussion were sent in. The beginners' section—of which the Secretary is now Mr. D. A. Jones, F.L.S., Rock House, Harlech—has had a fairly prosperous year; it has over forty members, less than half of whom sent in any plants for distribution. Some of the members, however, have displayed very gratifying interest in the section. A foreign section of the Club has been commenced during the past year, and promises to be a useful adjunct to the general work of the Society. Prof. Barker has acted as distributor, and Rev. C. H. Waddell, M.A., Saintfield Vicarage, Co. Down, continues to discharge the duties of Secretary.

We have been asked who is the author of the doggrel lines—

"Nature and Art to adorn the page combine,
And flowers exotic grace our northern clime"—

which have appeared on the title-pages and monthly wrappers of the *Botanical Magazine* since the beginning of the third series (vol. 71) in 1845. Can any reader supply the information?

The Linnean Society has been taking the opinion of its Fellows as to the admission of women to the Society. The result has not yet been published, but we trust it will result in the obtaining of the sought-for privilege, although we think those interested in the movement have not always been fortunate in their spokeswomen.

The *Nuovo Giornale Botanico Italiano* (dated January and issued in March) contains an account by Dr. Buscalioni of his efforts to interest botanists in the scheme for establishing an international botanical establishment in Brazil. The names of the botanists consulted in England, where the scheme met with but slight encouragement, appear in forms which their owners will hardly recognize: "Förster," "Marshall Word," "il prof. G. Murraw," "il Professor Brettler Farmer," and "Sir Tyselton Dyer," who "non volle interessarsi in alcun modo della questione." Dr. Buscalioni considers the indifference with which his mission was received as due to the "carattere meticolosamente riflessivo e poco proclive di rapidi entusiasmi del popolo inglese." He should have been here on "Mafficking Night"!

At the anniversary meeting of the Linnean Society on May 24, Dr. D. H. Scott was elected Botanical Secretary in succession to Mr. B. D. Jackson, who has filled the post with much satisfaction since 1880. It is gratifying to know that the Society is not to lose Mr. Jackson's services; he now becomes "General Secretary," in which post he will continue the general work hitherto done by him as senior Secretary, with the addition of the duties until lately undertaken by Mr. J. E. Harting.

We regret to announce the death of Mr. J. C. Mansel-Pleydell, who during a period of thirty-five years has been a frequent contributor to this Journal. The Rev. E. F. Linton will contribute an appreciation of the deceased botanist to our next issue.

Down; Malbay and Kilkee, Co. Clare. Channel Islands (Jersey, Guernsey, Alderney). Not uncommon.

L. Laminariæ Harv. Coasts of Cornwall (Scilly Isles, Trevone Bay, Mount's Bay, Fowey, Looe); Northumberland (Holy Island, Berwick). Wales: Anglesea (Llanvælog, Towyn-y-Capel). Scotland: Berwicks. (Burnmouth); Haddington (Dunbar); Edinburgh (Burntisland); Fife (Elie, Pittenweem); Forfar (Arbroath); Orkney Islands; Argyle (Appin). Ireland: Coast of Cork and Antrim; Aran Island, Co. Galway; Kilkee, Co. Clare. Not uncommon.

Subgenus Pogotrichum Reinke.

L. filiformis Batt. (= *Pogotrichum filiforme* Rke.). Coast of Dorset (Weymouth); Renfrew (Gare Loch); Bute (Isle of Cumbrae). Locally abundant.—*β gracilis* Batt. Renfrew (Gare Loch).

L. Hibernicus Batt. (= *Pogotrichum Hibernicum* T. Johns.). West coast of Ireland (Kilkee, Co. Clare). Rare.

Gen. 78. Phæospora Aresch. emend. Rke.

P. brachiata Born. (= *Ectocarpus brachiatus* Harv. et *Stictyosiphon Griffithsianus* Holm. & Batt.). Coasts of Cornwall (St. Michael's Mount, Mount's Bay, Lizard, Falmouth, Fowey, Mount Edgcumbe); Devon (Ilfracombe, Plymouth, Meadfoot, Torquay); Dorset (Weymouth); Hants (Isle of Wight). Scotland: Edinburgh (Joppa); Fife (Kincraig, Elie); Aberdeen (Peterhead); Orkney Islands (Kirkwall); Bute (Isle of Arran); Ayr (Seamill, Ardrossan); Renfrew (Wemyss Bay). Ireland (Youghal, Co. Cork; Lambay Island, Co. Dublin). Channel Islands (Alderney). Rather rare.

Gen. 79. Stictyosiphon Kütz.

S. subarticulatus Hauck. Coasts of Cornwall (Falmouth); Northumberland (Cullercoats, Berwick); Cheshire (Hilbre Island). Wales (Carnarvon). Scotland: Berwicks. (Burnmouth); Haddington (Dunbar); Orkney Islands (Skaill); Bute (Isles of Cumbrae and Arran). Ireland: Coast of Connemara. Rather rare.

S. tortilis Rke. Coasts of Devon (Plymouth Sound); Yorks Filey, Scarborough); Northumberland (Cullercoats, Berwick). Scotland: Berwicks. (Burnmouth); Haddington (Dunbar); Edinburgh (Joppa); Fife (Kinghorn, Earlsferry, Elie); Moray Firth (Lossiemouth); Orkney Islands (Skaill); Bute (Isles of Arran and Bute). Not uncommon on the coast of Scotland and the North of England.

Gen. 80. Striaria Grev.

S. attenuata Grev. Coasts of Cornwall (Boscastle, Penzance, Falmouth, St. Mawes, Torpoint); Devon (Ilfracombe, Plymouth, Torbay, Sidmouth, Salcombe); Hants (Isle of Wight); Sussex (Pagham, Brighton); Isle of Man. Scotland: Orkney Islands; Argyle (Appin); Bute (Isles of Arran, Cumbrae, and Bute). Ireland: Belfast Lough, Strangford Lough, Roundstone. Rare.—*β crinita* J. Ag. Coast of Cornwall (Boscastle, Bossiney Cove). Ireland (Balbriggan, Co. Dublin). Rare.

Gen. 81. Phæosaccion Farlow.

P. Collinsii Farlow. S.W. coast of Scotland: Bute (Isle of Cumbrae). Very rare.

Gen. 82. Punctaria Grev.

Subgenus 1. Eupunctaria.

P. plantaginea Grev. Coasts of Cornwall (St. Minver, Penzance, Mount's Bay, Falmouth); Devon (Ilfracombe, Plymouth, Torbay, Dawlish); Dorset (Weymouth, Swanage); Hants (Isle of Wight); Sussex (Bognor, Brighton); Essex (Harwich); Norfolk (Cromer); Yorks (Filey, Scarborough); Durham (Sunderland); Northumberland (Alnmouth, Holy Island, Berwick); Cheshire (Hilbre Island); Isle of Man. Wales: Anglesea (Puffin Island, Llangwyfan, Llanvælog). Scotland: Berwicks. (Burnmouth); Haddington (Dunbar); Edinburgh (Joppa, Caroline Park); Fife (Earlsferry, Elie); Forfar (Arbroath); Orkney Islands; Argyle (Oban, Loch Etive, &c.); Bute (Isles of Arran and Cumbrae); Renfrew (Wemyss Bay); Ayr (Portincross, Ardrossan, &c.). Ireland: Belfast, Co. Antrim; Killiney and Kingstown, Co. Dublin; Wicklow. Channel Islands (Jersey, Guernsey, Alderney). Not uncommon.—*β Crouani* Thur. Coast of Bute (Isle of Cumbrae).— *γ rubescens* Batt. (= *Punctaria rubescens* J. Ag.; *Homœostroma plantagineum* forma *torta* Holm. & Batt.). Coast of Bute (Isle of Cumbrae); Orkney Islands (Skaill).

P. latifolia Grev. *α genuina* Batt. (= *Homœostroma latifolium* J. Ag. Anal. iii. p. 11). Coasts of Somerset (Minehead); Cornwall (Marazion, Falmouth, Looe); Devon (Bovisand, Meadfoot, Tor Abbey, Sidmouth); Hants (Isle of Wight); Norfolk (Cromer). Scotland: Edinburgh (Joppa); Aberdeen (Peterhead); Orkney Islands (Rousay); Argyle (Islay); Bute (Isles of Arran and Cumbrae). Ireland: Belfast, Co. Antrim; Kilkee, Co. Clare; and West of Ireland generally. Channel Islands (Jersey, Guernsey, Alderney). Not common. — *β lanceolata* Batt. (= *Homœostroma plantagineum* J. Ag. Anal. iii. p. 11). Coasts of Devon (Torbay) and Hants (Isle of Wight).—*γ laminarioides* Holm. & Batt. (= *Nematophlœa latifolia* J. Ag. Anal. iii. p. 16). Coasts of Cornwall (Porthellick Bay and Porth Loo, Scilly) and Devon (Torquay, Sidmouth). Scotland: Bute (Isle of Cumbrae). Rare.

P. tenuissima Grev. (= *P. latifolia* Grev. var. *Zosteræ* Le Jol.; *Diplostromium tenuissimum* Kütz.). Coasts of Dorset (Weymouth); Sussex (Brighton); Isle of Man. Scotland: Fife (Kincraig, Earlsferry, Elie); Orkney Islands (Kirkwall); Argyle (Appin, Loch Etive); Bute (Isles of Arran, Cumbrae, and Bute); Renfrew (Wemyss Bay); Ayr (Largs, Fairlie, Ardrossan). Ireland (Dublin Bay). Locally abundant.

Subgenus 2. Desmotrichum (Kütz.).

P. undulata J. Ag. (= *Desmotrichum undulatum* Rke.). Southern shores of Scotland: Bute (Isles of Cumbrae and Bute); Orkney Islands.

P. baltica Batt. (= *Desmotrichum balticum* Kütz.). Coast of Dorset (Weymouth).

Subgenus 3. Phycolapathum (Kütz.).

P. crispata Batt. (= *Phycolapathum crispatum* Kütz. *P. debile* Kütz. (partim). *Punctaria laminarioides* Crn.). Coast of the Scilly Islands (Bryer, Samson, St. Martin's, Porthellick Bay). Locally abundant.

Fam. Scytosiphonaceæ Thur.

Gen. 83. Phyllitis Kütz.

P. filiformis Batt. Coasts of Hants (Isle of Wight), Essex (Clacton), and Northumberland (Berwick). Probably not uncommon.

P. zosterifolia Rke. Coasts of Northumberland (Berwick); Cheshire (Hilbre Island); Isle of Man. Wales: Anglesea (Puffin Island). Scotland: Edinburgh (Joppa); Fife (Kinghorn, Elie); Ayr (Portincross).

P. Fascia Kütz. *α genuina* (= *Laminaria fascia* Harv. et *Phyllitis cæspitosa* Le Jol.). Coasts of Cornwall (St. Minver, Looe); Devon (Torquay, Sidmouth, Salcombe); Dorset (Weymouth); Hants (Isle of Wight); Essex (Leigh); Durham (Sunderland); Northumberland (Whitley, Alnmouth, Holy Island, Berwick). Scotland: Haddington (Dunbar, North Berwick); Edinburgh (Joppa, Leith); Fife (Kinghorn, Earlsferry, Elie); Forfar (Arbroath); Kincardine (Stonehaven, Bay of Nigg); Aberdeen (Peterhead); Orkney Islands (Skaill); Argyle (Loch Etive); Bute (Isles of Arran, Cumbrae, and Bute); Ayr (Ardrossan, Saltcoats). Ireland (Malahide, Co. Dublin; Carrickfergus and Larne, Co. Antrim; Kilkee, Co. Clare). Channel Islands (Guernsey). Not common.—*β tenuissima* Batt. (= *P. tenuissima* J. Ag.). Coast of Yorks (Flamborough Head); Orkney Islands (Skaill).—*γ debilis* Hauck. Coast of Cornwall (Mousehole, near Penzance). Scotland: Edinburgh (Joppa); Forfar (Arbroath); Bute (Isle of Cumbrae); Hebrides. Rare.

Gen. 84. Scytosiphon Ag.

S. lomentarius J. Ag. (= *Chorda lomentaria* Lyngb.). Coasts of Cornwall (Scilly Islands, St. Minver, Penzance, Mount's Bay, Falmouth, Looe); Devon (Torquay, Dawlish, Sidmouth); Dorset (Weymouth, Swanage); Hants (Isle of Wight); Sussex (Brighton); Kent (Dover, Deal); Essex (Harwich); Yorks (Filey, Scarborough, Whitby); Durham (Sunderland, Hartlepool); Northumberland (Alnmouth, Holy Island, Berwick); Cheshire (Hilbre Island); Isle of Man. Wales: Anglesea (Llangwyfan, Puffin Island). Scotland: Berwicks. (Burnmouth); Haddington (Dunbar); Edinburgh (Joppa); Fife (Earlsferry, Elie, St. Andrew's); Forfar (Arbroath); Kincardine (Stonehaven); Aberdeen (Peterhead); Orkney Islands (Skaill); Argyle (Firth of Lorne, Loch Etive); Bute (Isles of Arran, Cumbrae, and Bute); Ayr (Ayr Heads, &c.). Ireland (Wicklow; Kingstown, Co. Dublin; Belfast, Co. Antrim; Milltown Malbay, Co. Clare, &c.). Channel Islands (Jersey, Guernsey, Alderney, Sark). Common and abundant on the shores of the British Islands.—*β zostericola* Thur. Coast of Dorset (Weymouth); Bute (Isle of Cumbrae); Orkney Islands. Not uncommon.

S. pygmæus Rke. Coast of Dorset (Weymouth, Swanage). Rare.

Fam. Asperococcaceæ Farlow.

Gen. 85. Asperococcus Lamour.

A. scaber Kck. Beiträge z. Kenntniss der Meeresalgen, p. 52. Coasts of Dorset (Weymouth, April, 1892) and Bute (Isle of Cumbrae, August, 1891, E. A. B.). Very rare.

A. fistulosus Hooker, Br. Fl. iii. p. 277 (= *Ulva fistulosa* Huds. Fl. Angl. ed. 2, p. 569 (1778); Smith, Eng. Bot. tab. 642 (Sept. 1799), e spec. auth. in Herb. Brit. Mus.; *Conferva echinata* Mert. in Roth, Cat. Bot. iii. p. 170 (1806); *Asperococcus echinatus* Grev. Alg. Br. p. 50, tab. 9 (1830). Coasts of Cornwall (St. Minver, Mount's Bay, Falmouth, Fowey, Looe); Devon (Plymouth, Torquay, Sidmouth); Dorset (Weymouth, Swanage); Hants (Isle of Wight); Sussex (Bognor, Worthing, Brighton); Kent (Dover); Norfolk (Cromer); Yorks (Filey, Scarborough, Whitby); Durham (Sunderland); Northumberland (Alnmouth, Holy Island, Berwick); Cheshire (Hilbre Island); Isle of Man. Wales: Anglesea (Puffin Island); Carnarvon (Bangor). Scotland: Berwicks. (Burnmouth); Haddington (Dunbar, North Berwick); Edinburgh (Caroline Park); Fife (Kirkcaldy, Earlsferry, Elie); Forfar (Arbroath); Kincardine (Stonehaven); Aberdeen (Peterhead); Moray Firth; Orkney Islands (Skaill); Argyle (Appin, Oban, Campbeltown); Bute (Isles of Arran and Cumbrae); Ayr (Portincross, Ardrossan). Ireland (Belfast, Co. Antrim; Roundstone, Co. Galway; Kilkee, Co. Clare; Bantry, Co. Cork, &c.). Channel Islands (Jersey, Guernsey, Alderney). Common and abundant everywhere on the shores of the British Islands.—*β vermicularis* (Griff.). Coasts of Devon (Torbay, Sidmouth); Hants (Isle of Wight); Durham (Roker); Northumberland (Berwick). **Not uncommon.**

A. bullosus Lamour. (= *A. Turneri* Hook.). Coasts of Cornwall (Mount's Bay, Falmouth, St. Mawes, Looe); Devon (Torquay, Sidmouth, Salcombe); Dorset (Weymouth, Swanage, Studland); Hants (Isle of Wight); Sussex (Brighton). Scotland: Orkney Islands; Argyle (Appin); Bute (Isles of Arran, Cumbrae, and Bute). Ireland (Bantry, Co. Cork; The Murrough, near Wicklow; Howth, Ireland's Eye, and Lambay Island, Co. Dublin; Strangford Lough, Co. Down; Clew Bay, Co. Mayo; Roundstone Bay, Co. Galway; Dingle and Valentia Harb., Co. Kerry). Channel Islands (Jersey, Guernsey). Locally abundant.

A. compressus Griff. Coasts of Cornwall (Boscastle, Penzance, Marazion, Falmouth, Pridmouth); Devon (Hele, Ilfracombe, Plymouth, Torbay, Sidmouth); Dorset (Weymouth). Scotland (Orkney Islands). Channel Islands (Jersey). Rare.

Gen. 86. Strepsithalia Sauv.

S. Buffhamiana Batt. (= *Streblonema Buffhamiana* Batt.). Coasts of Cornwall (Falmouth) and Dorset (Swanage). Creeping between the cortical filaments of *Mesogloia vermiculata* and *M. Griffithsiana*. **Rare.**

Gen. 87. Streblonema Derb. & Sol.

S. sphæricum Thur. Coast of Dorset (Weymouth, Swanage). Wales: Anglesea (Llangwyfan). Scotland: Bute; Ayr (Fairlie,

Seamill). Creeping between the cortical filaments of *Mesogloia vermiculata*. Probably not uncommon.

S. volubile Thur. Coasts of Devon (Torquay, Wembury, Teignmouth, Sidmouth) and Dorset (Swanage, Studland). Very rare. Creeping between the cortical filaments of *Dudresnaya verticillata*.

S. tenuissimum Hauck. Coasts of Devon (Meadfoot, Torquay) and Dorset (Swanage). Wales (Anglesea, Llangwyfan). Creeping between the cortical filaments of *Mesogloia Griffithsiana*. Rare.

S. intestinum Holm. & Batt. (= *Entonema intestinum* Reinsch). Coast of Dorset (Weymouth). Immersed in the cortical layers of *Brongniartella byssoides*. Very rare.

S. fasciculatum Thur. Coasts of Dorset (Weymouth) and Northumberland (Berwick). Wales: Anglesea (Llangwyfan). Scotland: Berwicks. (Burnmouth); Bute (Isles of Cumbrae and Bute). Channel Islands (Alderney). Immersed amongst the cortical filaments of *Castagnea virescens*.—*β simplex* Batt. Coasts of Dorset (Swanage) and Bute (Isle of Cumbrae). Immersed between the cortical filaments of *Helminthora divaricata* and *Castagnea virescens*. Rare.

S. infestians Batt. (= *Endodictyon infestians* Gran.). Coast of Hants (Southsea). Endozoic in species of *Alcyonidium*. Rare.

S. æquale Oltm. Coasts of Devon (Teignmouth); Dorset (Swanage); Hants (Isle of Wight). Scotland: Bute (Isle of Cumbrae). Immersed in the cortical layer of *Chorda filum*. Probably not uncommon.

S. Zanardinii (= *Ectocarpus Zanardinii* Crn.). Coasts of Cornwall (Falmouth); Devon (Torquay); Dorset (Swanage, Weymouth); Hants (Isle of Wight). Scotland: Bute (Isle of Cumbrae). Channel Islands (Guernsey). Immersed in the cortical layer of *Chylocladia kaliformis*. Probably not uncommon.

S.? helophorus (= *Ectocarpus helophorus* Rosenv.). Coasts of Northumberland (Berwick) and Bute (Isle of Cumbrae). Immersed in the fronds of *Petrocelis cruenta*. Rare.

Gen. 88. Ectocarpus Lyngb.

1. *Parasitic Species.*

E. parasiticus Sauv. Coasts of Dorset (Weymouth, Swanage), Sussex (Worthing), Northumberland (Berwick), and Bute (Isle of Cumbrae). Parasitic in the thallus of *Ceramium rubrum* and *Cystoclonium purpurascens*. Probably not uncommon.

E. Stilophoræ Crn. Coasts of Cornwall (Falmouth) and Dorset (Weymouth, Swanage). Parasitic in the fronds of *Stilophora rhizodes*. Rare. — *β cæspitosa* Rosenv. Coast of Dorset (Weymouth, Swanage). Rare. — *γ cervicornis* Batt. Coast of Cornwall (Falmouth). Very rare.

E. clandestinus Sauv. (= *Elachista clandestina* Crn.). Coasts of Devon (Sidmouth) and Northumberland. Parasitic in the thallus of various species of *Fuci*. Very rare.

E. breris Sauv. Coast of Northumberland (Berwick). Parasitic in the thallus of *Ascophyllum nodosum*. Rare.

E. Valiantei Born. in Journ. de Botanique, vi. 1892. Parasitic in the thallus of *Cystoseira ericoides*. Cobo, Guernsey, July, 1900, Mrs. A. Hamber.

E. luteolus Sauv. Coasts of Dorset (Weymouth, Swanage); Hants (Isle of Wight); Sussex (Brighton). Ireland (Dungarvan Bay, Co. Waterford). Parasitic in the thallus of *Fucus vesiculosus*. Probably not uncommon.

E. minimus Näg. Coasts of Kent (Dover) and Northumberland (Berwick). Wales: Carnarvon (Bangor). Ireland (Dungarvan Bay, Co. Waterford). Parasitic in the receptacles of *Himanthalia lorea*. Very rare.

E. microscopicus Batt. (= *Cylindrocarpus microscopicus* Crn. in Ann. Sc. Nat. iii. sér. vol. xv. p. 359, pl. 16, figs. 1–11 (1851); *Streblonema investiens* Thur. in Lloyd, Algues de l'Ouest de la France, No. 281 (1859); *E. investiens* Hauck). Coast of Dorset (Weymouth, Portland, Studland). Parasitic in the thallus of *Gracilaria compressa*. Rare.

E. microspongium Batt. Coast of Devon (Plymouth Sound). On *Ralfsia verrucosa*. Very rare.

E. tomentosoides Farlow. Coast of Dorset (Weymouth). Wales: Carnarvon (Bangor, Menai Straits, Anglesea, Towyn-y-Capel). Scotland: Bute (Isle of Cumbrae). On *Laminaria saccharina*. Rare. — *β punctiformis* Batt. (= *Ascocyclus balticus* Jack in Journ. Bot. 1890, p. 12, non Rke.). Coasts of Cornwall (Mousehole, near Penzance); Dorset (Weymouth); Northumberland (Berwick). Scotland: Forfar (Arbroath); Kincardine (Stonehaven); Bute (Isle of Cumbrae). Rare.

E. velutinus Kütz. (= *Flachista velutina* Phyc. Br.). Coasts of Cornwall (Mount's Bay, Fowey, Looe); Devon (Sidmouth); Sussex (Brighton); Kent (Deal); Norfolk (Cromer); Northumberland (Newbiggen, Holy Island, Berwick). Wales: Anglesea (Puffin Island, Towyn-y-Capel). Scotland: Berwicks. (Burnmouth); Haddington (Dunbar); Fife (Elie, Pittenweem, Kilrenny); Forfar (Arbroath); Kincardine (Cove); Orkney Islands (North Ronaldshay); Argyle (Appin). Ireland (Bantry Bay, Co. Cork; Roundstone, Co. Galway, &c.). Channel Islands (Guernsey, Jersey). On the receptacles of *Himanthalia lorea*. Not uncommon. — *β laterifructus* Batt. Coast of Devon (Plymouth Sound). Very rare.

E. Battersii Born. (= *E. parvulus* Holm. & Batt. Rev. List, non Kütz.). Coast of Devon (Sidmouth). On *Taonia atomaria*. Very rare.

E. solitarius Sauv. Coasts of Devon (Sidmouth) and Dorset (Swanage). Ireland (Dungarvan Bay, Co. Waterford). On *Dictyota dichotoma* and *D. ligulata*. Rare.

E. simplex Crn. Coasts of Cornwall (Trevone, Lizard, Falmouth, Fowey); Devon (Mudstone Bay, Brixham, Sidmouth). Scotland: Bute (Isle of Arran). Ireland (Bantry Bay, Castletown, and Bear Haven, Co. Cork; Gleninagh and Kilkee, Co. Clare). On *Codium tomentosum*. Not uncommon.

2. *Non-parasitic Species.*

E. repens Rke. (= *E. reptans* Holmes, Fasc. no. 35, non Crn.). Coasts of Cornwall (Trebarwith, Falmouth, Pridmouth, Fowey); Devon (Exmouth, Sidmouth); Dorset (Weymouth, Swanage); Northumberland (Berwick). Ireland (Dungarvan Bay, Co. Water-

ford). Rare. — *β confluens* Batt. (= *Ascocyclus reptans* Holmes, Fasc. no. 102 (partim)). Coast of Northumberland (Berwick). On *Chondrus crispus* and *Halidrys siliquosa*. Rare.

E. terminalis Kütz. Coasts of Cornwall (Bude, Trevone Bay, Newquay, Fowey, Looe); Devon (Sidmouth); Dorset (Weymouth); Northumberland (Berwick); Cheshire (Hilbre Island); Isle of Man. Wales: Anglesea (Puffin Island). Scotland: Orkney Islands (N. Ronaldshay); Argyle (Loch Etive); Bute (Isles of Arran and Cumbrae). Not uncommon.

E. erectus Kütz. Tab. Phyc. vol. v. Coasts of Essex (Clacton, Jan. 1893, E. A. B.) and Northumberland (Berwick, Oct. 1889, E. A. B.). Very rare.

E. Holmesii Batt. Coasts of Somerset (Minehead), Devon (Ilfracombe, Torquay, Sidmouth), and Northumberland (Berwick). Wales (Isle of Anglesea). Rare.

E. globifer Kütz. (= *E. insignis* Crn.). Coasts of Cornwall (Falmouth, Pridmouth); Devon (Sidmouth); Dorset (Smallmouth, near Weymouth). Scotland: Haddington (Dunbar); Bute (Isle of Arran); Ayr (Seamill). Rather rare. — *β rupestris* Batt. (= *E. cæspitulus* Holm. Fasc. no. 62, non J. Ag.; et *E. simpliciusculus* Ralfs in Trans. Penzance Nat. Hist. Soc. 1884, p. 324). Coasts of Cornwall (Boscastle, St. Minver, Newquay, Mount's Bay); Devon (Ladran Bay, Sidmouth); Northumberland (Berwick). Scotland: Haddington (Dunbar). Rare.

E. irregularis Kütz. Coasts of Sussex (Bognor) and Ayr (Seamill). Very rare.

E. Sandrianus Zan. (= *E. elegans* Thur.). Coasts of Cornwall (Falmouth, Pridmouth); Devon (Ilfracombe, Saunton); Dorset (Studland). Scotland: Bute (Isle of Arran); Ayr (Ardrossan). Very rare.

E. Mitchellæ Harv. (= *E. virescens* Thur.). Coasts of Devon (Paignton, Torquay, Dawlish) and Dorset (Weymouth, Swanage). Channel Islands (Guernsey). Rare.

E. Crouani Thur. Coasts of Cornwall (Boscastle); Devon (Elberry Cove, Torquay; Brixham, Sidmouth); Essex (between Harwich and Dovercourt). Scotland: Bute (Isle of Cumbrae). Rare.

E. confervoides Le Jol. Coasts of Cornwall (Padstow, Penzance, Falmouth); Devon (Plymouth, Torquay, Sidmouth); Dorset (Weymouth, Swanage); Sussex (Bognor); Essex (Harwich, Dovercourt); Yorks (Filey, Whitby); Northumberland (Holy Island, Berwick). Wales (Menai Straits). Scotland: Berwicks. (Burnmouth, Eyemouth); Haddington (Dunbar, North Berwick); Edinburgh (Joppa); Fife (Elie, Earlsferry); Forfar (Arbroath); Kincardine (Stonehaven); Aberdeen (Peterhead); Orkney Islands; Argyle (Loch Goil); Bute (Isles of Arran, Bute, and Cumbrae); Renfrew (Gourock). Ireland generally. Channel Islands (Jersey, Guernsey, Alderney). Common and abundant.—*β arctus* Kjellm. (= *E. arctus* Kütz. et *E. pseudosiliculosus* Crn.). Coasts of Cornwall (Scilly Islands, Mount Edgcumbe); Devon (Torquay); Dorset (Weymouth, Swanage). Scotland: Bute (Isle of Cumbrae); Ayr (Fairlie, Saltcoats). Channel Islands (Alderney). Not uncommon

on the leaves of *Zostera marina*.— *β penicilliformis* Kuck. Coast of Devon (Sidmouth, Torquay).

E. siliculosus Kütz. *α typica* Kjellm. Coasts of Cornwall (St. Minver, Falmouth, Looe); Devon (Torbay, Sidmouth); Dorset (Weymouth, Swanage): Hants (Isle of Wight); Sussex (Bognor, Brighton); Kent (Deal); Essex (Harwich); Norfolk (Cromer); Yorks (Filey, Scarborough, Whitby); Durham (Seaton Carew, Hartlepool); Northumberland (Alnmouth, Holy Island, Berwick); Cheshire (New Brighton, Hilbre Island); Isle of Man. Wales (Anglesea, Puffin Island). Scotland: Berwicks. (Burnmouth); Haddington (Dunbar); Edinburgh (Joppa); Fife (Elie); Forfar (Arbroath); Kincardine (Stonehaven); Aberdeen (Peterhead); Orkney Islands; Argyle (Oban, Loch Goil); Bute (Isles of Cumbrae and Arran); Renfrew (Gourock); Ayr (Ardrossan). Irish coasts generally. Channel Islands (Jersey, Guernsey, Alderney). Common and abundant everywhere on the shores of the British Islands. — *β spalatina* Kjellm. (= *E. myriocarpus* Tellam in Trans. Penzance Nat. Hist. Soc., New Series, vol. iii. p. 378?). Coasts of Cornwall (Boscastle, Fowey, St. Michael's Mount); Devon (Sidmouth; Dorset (Weymouth). Probably not uncommon.—*γ longipes* Harv. Coasts of Jersey and Cornwall (St. Minver, Fowey).— *δ hiemalis* Kuck. (= *E. hiemalis* Crn.). Coasts of Cornwall (Padstow); Devon (Teignmouth); Dorset (Weymouth); Sussex (Bognor). Scotland: Haddington (Dunbar). Rare.—*ε subulatus* Hauck (= *E. amphibius* Harv.). Coasts of Gloucester (River Avon below Bristol); Essex (between Harwich and Dovercourt); Norfolk (Cley). Rare.

E. penicillatus Ag. Coasts of Devon (Plymouth, Torquay); Dorset (Swanage). Scotland: Bute (Isle of Cumbrae). Rare.

E. dasycarpus Kuck. Coast of Dorset (Swanage). Rare.

E. fasciculatus Harv. *α typica*. Coasts of Cornwall (Mount's Bay, Fowey, Looe); Devon (Torquay, Sidmouth); Dorset (Weymouth, Swanage); Hants (Isle of Wight); Sussex (Brighton); Norfolk (Cromer); Yorks (Scarborough, Whitby); Northumberland (Cullercoats, Alnmouth, Holy Island, Berwick); Cheshire (Hilbre Island). Wales: Anglesea (Puffin Island). Scotland: Berwicks. (Burnmouth); Haddington (Dunbar); Edinburgh (Joppa, Caroline Park); Fife (Kinghorn, Earlsferry, Elie); Forfar (Arbroath); Kincardine (Stonehaven); Aberdeen (Peterhead); Orkney Islands; Dumbarton (Helensburgh); Bute (Isle of Cumbrae); Ayr (Portincross, W. Kilbride). Ireland (Maugan's Bay, Co. Waterford; Strangford Lough, Co. Down, &c., not uncommon). Channel Islands (Jersey, Guernsey, Alderney). Not uncommon. — *β congesta* (Crn.) (= *E. congestus* Crn. and *E. glomeratus* Thur.). Coasts of Cornwall (Lizard) and Dorset (Swanage). Scotland (Orkney Islands). Rather rare. — *γ draparnaldioides* Crn. Coasts of Cornwall (Falmouth); Devon (Sidmouth); Dorset (Weymouth); Northumberland (Holy Island, Berwick); Scotland (Orkney Islands). Not uncommon.—*δ pygmæus* Batt. (= *E. pygmæus* Aresch.?) Coasts of Bute. Rare.

E. tomentosus Lyngb. Coasts of Cornwall (St. Minver, Penzance, Mount's Bay, Falmouth, Looe); Devon (Plymouth, Torbay,

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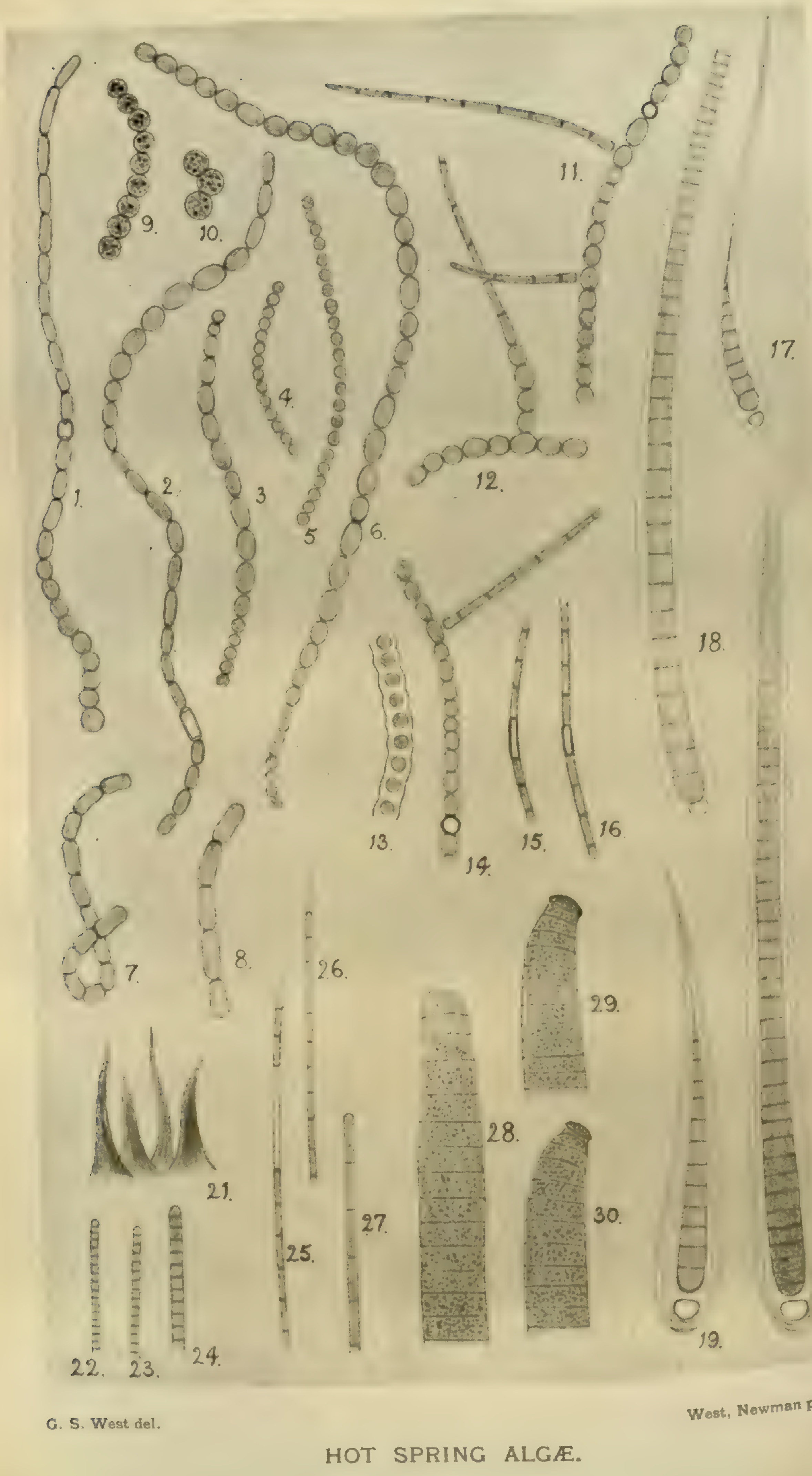


G. S. West del.

West, Newman photo.

HOT SPRING ALGÆ.

ON SOME ALGÆ FROM HOT SPRINGS.

By G. S. West, M.A., F.L.S.

(Plate 439.)

The vegetation inhabiting hot waters consists principally of blue-green algæ, or *Myxophyceæ*. These algæ are of particular interest on account of the manner in which they assist in the deposition of considerable quantities of calcareous travertine and siliceous sinter. The formation of rock-masses by the agency of algæ living in hot springs charged with carbonate of lime or with silica has been ably described by Weed* from observations on the geysers and hot springs of the Yellowstone National Park, U.S.A. He likewise gives a review of the literature on the vegetation of hot waters; and, although numerous people had noticed the occurrence of algal growths in such situations, up to that time, few careful observations had been made with regard to the specific nature of the plants which caused the construction of hot-spring deposits.

In referring to the occurrence of hot-water growths in such widely-separated localities as Iceland, the Azores, New Zealand, Japan, and the United States, Weed remarks that "the flora is very uniform in character, being limited to a few groups, and the species themselves being identical to a great extent." This I cannot altogether agree with, as even the few collections from Iceland have a fairly diverse character, and the number of species is not small. Schmidle† has recently given an account of some algæ from hot springs in tropical Africa (temp. 40° C.), and, of the sixteen species he records, only two, *Phormidium laminosum* (Ag.) Gomont and *Mastigocladus laminosus* Cohn, are present in the collections I have examined from Iceland. Miss J. E. Tilden‡ has also specifically examined some algæ from the geysers of the Yellowstone National Park, U.S.A., and, of the species she records, only one, *Phormidium laminosum* (Ag.) Gomont, is present in the Iceland material.

The highest temperature at which algæ will exist is said to be 94·5° C. (200° F.). This was observed by Brewer§ in California. From Iceland, 85° C. (185° F.) was the highest temperature of the water in which algæ were collected. These algæ living at a temperature of 85° C. were, with the exception of a few Diatoms, filamentous, and consisted of *Phormidium angustissimum* West & G. S. West, *P. tenue* (Menegh.) Gomont, and *Mastigocladus laminosus*

---

* W. H. Weed, "Formation of Travertine and Siliceous Sinter by the Vegetation of Hot Springs," Rep. U.S. Geol. Survey, 1887–88.

† W. Schmidle, "Ueber die tropische afrikanische Thermalalgenflora," Engler's Bot. Jahrbüchern, 1901, Bd. 30, Heft 2.

‡ J. E. Tilden, "On some Algal Stalactites of the Yellowstone National Park," Bot. Gazette, xxiv. no. 3, 1897.

§ W. H. Brewer in Amer. Journ. Science, ser. 2, xli.

Cohn. This I believe to be the highest temperature at which filamentous algæ have been collected.

I.—Algæ from Hot Springs in Iceland.

Some months ago, Mr. A. W. Hill, of the Botanical Laboratory, Cambridge, most kindly forwarded to me a number of tubes of algæ which he collected in hot springs in Iceland in 1900. Some of them were from Hveravellir, almost in the centre of the island; others were from the mountain range Kerlingarföll, and one was from the hot stream running from the Great Geyser. The collections, which were preserved in copper lactate, have proved to be very interesting, consisting mostly of filamentous *Myxophyceæ* and numerous small Diatoms. Twelve genera of green and blue-green algæ are represented, and amongst the most abundant was *Mastigocladus laminosus* Cohn, an alga which is widely distributed in hot springs all over the world. An undescribed species of the genus *Aulosira* was also in quantity, and other algæ of note were *Oscillatoria proboscidea* Gomont, *O. numidica* Gomont, and *Calothrix parietina* Thuret, var. *thermalis*. Four species of Desmids were observed, three of which indicate the adaptation of distinctly northern types to life in hot water.

The first mention of algæ from hot springs in Iceland was by Sir William Hooker, who visited many of the hot springs in 1809, and found several species of "*Conferva*" in them; later, Berkley found species of *Hyphæothrix* in collections made by Baring-Gould in the spray and overflow of the spring Tunguhver. Lauder Lindsay (1861)* also found two kinds of "*Conferva*" in some very hot springs at Laugarnes.

Only a few *Conjugatæ* and one alga belonging to the *Confervaceæ* were found in Mr. Hill's Icelandic material; but in the streams issuing from the hot springs of New Zealand, Dr. S. Berggren† states that *Zygnemaceæ* and *Confervaceæ* are found in great abundance, and several algæ of this nature have been found in the hot and warm waters of the island of Dominica, in the West Indies.‡

Quite recently, Börgesen, in a paper entitled "Nogle Ferskvandsalger fra Island,"§ has published an account of some algæ from Iceland, all of which are *Chlorophyceæ*. Of the species found in Mr. Hill's collections from hot springs, only *Hormiscia subtilis* (Kütz.) De Toni has been previously recorded for the island. Several interesting papers by Wille and Börgesen on algæ from the Faröe Islands have also recently appeared.

Chlorophyceæ.

1. *Hormiscia subtilis* (Kütz.) De Toni. Crass. fil. 4·3–5·2 μ. Kerlingarföll. Temperature not definitely known (between 30° and 50° C.).

---

* Bot. Zeitung, 1861, p. 359.

† S. Berggren in Nordstedt's "Freshw. Alg. of New Zeal. and Austral.," Kongl. Sv. Vet.-Akad. Handl., Bd. 22, no. 8, 1888.

‡ West, "Freshw. Alg. from West Indies," Journ. Linn. Soc. (Bot.) xxx. 1894.

§ Börgesen in Bot. Tidsskrift, Bd. 22, 1898.

Var. *variabilis* (Kütz.) Kirchn. Crass. fil. 7·2–8·8 μ. With the type.

2. *Zygnema* sp. Specimens sterile; crass. fil. 13·5–15 μ, cells $1\frac{1}{2}$–$2\frac{1}{2}$ times longer than the diameter. Kerlingarföll.

3. *Tetmemorus lævis* (Kütz.) Ralfs. Hveravellir, temp. 55° C. The specimens were quite normal. This species has been observed in the mud of a warm stream in Dominica, West Indies (*cfr.* West in Journ. Linn. Soc. (Bot.) xxx. p. 267).

4. *Cosmarium Holmiense* Lund. var. *integrum* Lund. Hveravellir, temp. 60° C. This Desmid is essentially of a northern type, usually preferring a situation amongst wet mosses on dripping rocks. It is an upland species with a decided preference for cold water, and it is rather strange to find it adapted to a temperature of 60° C.

5. *Cosmarium angulosum* Bréb. Hveravellir, abundant in a spring at a temperature of 55° C. Many of the examples were small forms very much resembling the var. *concinnum* (Rabenh.) West & G. S. West.

6. *Cosmarium subarctoum* (Lagerh.) Racib. in Rozpraw Wydz. matem.-przy. Akad. Umiej. Krakow. tom. xxii. 1892, p. 385, t. vi. f. 24. *C. globosum* Buln. subsp. *subarctoum* Lagerh. in Wittr. & Nordst. Alg. Exsicc. 1883, no. 567.

Long. 12 μ; lat. 8–9 μ; lat. isthm. 6·7–7·4 μ.

Hveravellir, temp. 55° C.

This small *Cosmarium* greatly resembles *C. globosum* in outward form, but is very much smaller. It also stands very near to certain forms of *C. tinctum* Ralfs, but is not quite so large, and is without the coloured cell-wall.

Myxophyceæ.

7. *Calothrix parietina* Thur. var. THERMALIS, var. n. (figs. 17–20).

Var. vaginis subcrassis, achrois, sublamellosis et non ocreatis, in plantis vetustis lutescentibus; cellulis diametro plerumque æqualibus vel interdum 2-plo brevioribus; heterocystis basilaribus et latis.

Crass. fil. 11–19 μ; crass. trich. 6·7–11·5 μ.

On rocks and stones, Hveravellir, temp. 24° C.

This variety is distinguished from all other forms of *C. parietina* by its thicker and more lamellose sheath.

8. *Calothrix epiphytica* West & G. S. West. Crass. fil. 7–7·5 μ; crass. trich. 3·5 μ; crass. heterocyst. 4·5 μ. Hveravellir, temp. 38° C.

9. *Dichothrix compacta* (Ag.) Born. & Flah. Sheaths golden-yellow or brown, ocreate, consisting of many close lamellæ; cells near the base a little shorter than the diameter, but equal or longer towards the apices. Crass. fil. 10·5–13·5 μ; crass. trich. 4·2–5 μ. Hveravellir, temp. 55° C. This species is known from the cold waters of the Faröe Islands.

10. *Mastigocladus laminosus* Cohn, 1863, (Syn. *Hapalosiphon laminosus* Hansg. 1885.) Crass. fil. 5·7–7 μ; crass. trich. 3·7–5·1 μ;

crass. ram. 1·7–3 μ (figs. 11–16). Hveravellir, temp. 55° C.; also in the spray of a small geyser (temp. of spray 85° C.). In stream from the Great Geyser, mean temp. about 40° C. In all cases the specimens were partly encrusted with carbonate of lime.

The primary filaments of this plant possessed a well-marked sheath, sometimes thin with parallel edges, sometimes a little thicker with undulate margins, and pale yellow in colour. The cells were globose, ellipsoidal, or oblong with rounded ends. The branches are usually much shorter and thinner than the primary filaments, and are very slightly attenuated. The cells are longer and cylindrical, from $1\frac{1}{2}$–6 times longer than their diameter. Heterocysts subglobose in the primary filaments, and cylindrical in the branches (up to 5 times longer than their diameter).

The genus *Mastigocladus* is scarcely to be distinguished from the earlier genus *Hapalosiphon* of Nägeli, only differing from the latter in the narrower, attenuated branches. *Mastigocladus laminosus* appears to be much more readily broken up than species of the genus *Hapalosiphon*.

11. *Nostoc muscorum* Ag. Crass. trich. 3–3·5 μ; cells $1\frac{1}{3}$–$1\frac{3}{4}$ times longer than their diameter. In expanded gelatinous sheets, Hveravellir, temp. 55° C.

12. *Nostoc pruniforme* Ag. A variety with a thin, contorted, lacerated thallus; cells subglobose or a little longer than their diameter, with their adjacent poles slightly flattened. Crass. trich. 5·2–5·8 μ; crass. heterocyst. 5·7–6·5 μ. Hveravellir, temp. 49° C.

13. **Aulosira thermalis,** sp. n. (figs. 1–10). Filis ærugineis, in fasciculis densissime aggregatis, flexuosis vel subcontortis; vagina delicatissima et hyalina; trichomatibus facile dissociatis, cellulis vegetativis subglobosis, ellipsoideis vel suboblongis; heterocystis sparsis, subquadratis vel oblongis, cellulis vegetativis vix crassioribus; sporis globosis, ellipsoideis vel oblongo-cylindricis, catenatis. Crass. trich. 2·3–3·2 μ; crass. heterocyst. 3·5–3·8 μ; long. heterocyst. 5·7–8·8 μ; crass. spor. 3·8–7·7 μ; long. spor. 3·8–13·5 μ.

Hveravellir, in great abundance at temperatures from 55°–61° C.

The cells of the ordinary vegetative trichomes are small, subspherical, or a little longer than their diameter. The cell-contents appear to be absolutely homogeneous, and of a pale blue-green colour. The heterocysts are very scarce, oblong-cylindrical in form, and are of approximately the same thickness as the rest of the filament. The spores, which are developed from cells of the ordinary vegetative trichome, always arise in long series, and are formed by the further growth and enlargement of the cells of the trichome. It sometimes happens that the cells elongate prior to the increase in diameter. The ripe spores exhibit numerous granules in the cell-contents.

A. thermalis is about half the size of any of the other species of the genus, and, in addition, it can easily be recognized by the close aggregation of the filaments.

14. *Phormidium luridum* (Kütz.) Gomont. Crass. trich. 1·9–2 μ; long. cell. 1·9–3 μ. Hveravellir, temp. 38° C.

15. *Phormidium laminosum* (Ag.) Gomont. Crass. trich. 1·3–1·6 μ. Hveravellir, temp. 24° C. This species occurs frequently on stones and rocks in warm springs.

16. *Phormidium angustissimum* West & G. S. West in Journ. Bot. 1897, p. 298. Crass. trich. 0·7 μ. Hveravellir, in hot spring, temp. 55° C. Also in spray of a small geyser, temp. of spray 85° C. In the stream from the Great Geyser, mean temp. about 40° C.

Gomont has recently described a species of this genus under the name of *P. Treleasei* (*cfr.* Bull. Soc. Bot. France, 1899, tom. xlvi. p. 37), which is a very close ally, if not identical, with *P. angustissimum*. It is of the same thickness, and possesses cells of the same length.

17. *Phormidium tenue* (Menegh.) Gomont. Crass. trich. 1·8–2 μ; long. cell. 3·5–4·8 μ. Hveravellir, in spray of small geyser, temp. 85° C.

18. *Phormidium subuliforme* Gomont. Crass. trich. 2·6–2·9 μ; long. cell. 4·7–7·4 μ. Apices of trichomes attenuated and slightly curved; apical cell somewhat acutely conical; cell-contents very granulose. Hveravellir, temp. 55° C. This species has only previously been observed in the island of St. Paul, in the Pacific.

19. *Oscillatoria limosa* Kütz. Crass. trich. 13 μ. Hveravellir, temp. 49° C.

20. *Oscillatoria proboscidea* Gomont. Var. trichomatibus paullo crassioribus; cellulis diametro $2\frac{1}{2}$–3-plo brevioribus, levissime tumidulis. Crass. trich. 15·3–18 μ; long. cell. 5·5–7·7 μ. Hveravellir, in hot springs, temp. 24°–38° C. In stream from Great Geyser, mean temp. about 40° C. (figs. 28–30).

This was the largest *Oscillatoria* observed in the collections. It agrees with *O. proboscidea* in all essential points, but the trichomes are a little thicker, and the cells are often very slightly swollen. The apices of the trichomes were variable; some were obtusely rounded or conical, but most of them were curved and attenuated, the apical cell being convex, subcapitate, and slightly thickened. A few trichomes were noticed which bore much resemblance to *O. trapezica* Tilden (in Bull. Torr. Bot. Club, Feb. 1896, vol. xxiii. no. 2, pp. 58–59, cum fig. xylogr.), some of the cells being wider than others, and the apical cell being merely rounded.

21. *Oscillatoria numidica* Gomont. Crass. trich. 3·6–4·2 μ. In stream from Great Geyser, mean temp. about 40° C. This species has only previously been observed from hot springs at Hammam-Salahin, Numidia.

22. *Chroococcus helveticus* Näg. Diam. cell. 5·7–8·5 μ, cum integ. 11·5–14·5 μ. Hveravellir, on rocks and stones among *Calothrix parietina* var. *thermalis*, temp. 24° C.

Bacillarieæ.

23. *Amphora Normanii* Rabenh. Hveravellir, temp. 49° and 55° C.

24. *Navicula viridis* Kütz. Hveravellir, temp. 38° and 60° C. In spray of small geyser, temp. 85° C. In stream from Great

Geyser, temp. 40° C. Many of the specimens were large and oblong, with the markings reaching almost up to the median line.

25. *Navicula borealis* (Ehrenb.) Kütz. Hveravellir, temp. 55° C. In stream from the Great Geyser, temp. 40° C.

26. *Navicula Brébissonii* Kütz. Hveravellir, temp. 24° and 49° C.

27. *Navicula gibba* (Ehrenb.) Kütz. Hveravellir, temp. 55° C. Kerlingarföll, temp. between 30° and 50° C.

28. *Navicula oblonga* Kütz. Hveravellir, temp. 61° C.

29. *Navicula oculata* Bréb. Hveravellir, temp. 55° C.

30. *Navicula mutica* Kütz. var. *quinquenodis*. Hveravellir, temp. 55° C.

31. *Navicula subcapitata* Greg. Hveravellir, temp. 38° and 49° C.

32. *Vanheurckia rhomboides* (Ehrenb.) Bréb. Hveravellir, temp. 49° and 55° C.

Var. *saxonica* (Rabenh.) West & G. S. West. Hveravellir, at temperatures of 24°, 38°, 49°, and 55° C. This species was in abundance.

33. *Gomphonema gracile* Ehrenb. Hveravellir, temp. 55° C.; also at a temperature of 49° C. with sporangial valves. Stream from the Great Geyser, temp. 40° C.

34. *Achnanthes microcephala* (Kütz.) Grun. Hveravellir, temp. 55° C.

35. *Achnanthes linearis* (W. Sm.) Grun. Kerlingarföll, temp. between 30° and 50°.

36. *Achnanthes lanceolata* (Bréb.) Grun. Hveravellir, temp. 24° C.

37. *Achnanthes Hungarica* Grun. Kerlingarföll, temp. between 30° and 50° C.

38. *Epithemia turgida* (Ehrenb.) Kütz. Hveravellir, temp. 38° C.; in spray of small geyser, temp. 85° C.

39. *Epithemia gibba* Kütz. var. *ventricosa* (Kütz.) Van Heurck. Hveravellir, at temperatures of 24°, 49°, 55° (very short valves, in many cases no longer than broad), and 61° C. In spray of small geyser, temp. of spray 85° C. In stream from Great Geyser.

40. *Epithemia Argus* (Ehrenb.) Kütz. More or less abundant in the same collections as the preceding species.

41. *Epithemia gibberula* (Ehrenb.) Kütz. With the preceding species, but not so abundant.

42. *Eunotia Arcus* Ehrenb. Kerlingarföll; short, stout forms, very abundant at a temperature from 30° to 50° C.

43. *Eunotia exigua* (Bréb.) Rabenh. With the preceding species.

44. *Synedra Ulna* (Nitzsch) Ehrenb. var. *lanceolata* (Kütz.) Van Heurck. Hveravellir, temp. 49° C.

45. *Tabellaria flocculosa* (Roth) Kütz. Kerlingarföll, temp. between 30° and 50° C.

46. *Surirella ovalis* Bréb. Stream from Great Geyser, mean temp. 40° C.

Var. *minuta* (Bréb.) Van Heurck. With the typical form.

47. *Hantzschia Amphioxys* (Ehrenb.) Grun. Stream from Great Geyser, mean temp. 40° C.

48. *Nitzschia commutata* Grun. Hveravellir, temp. 38° C.

49. *Nitzschia Denticula* Grun. Hveravellir, very abundant at a temperature of 24° C.

50. *Nitzschia dissipata* (Kütz.) Grun. Hveravellir, at temperatures of 38° and 49° C. In spray of small geyser, temp. 85° C.

51. *Nitzschia linearis* (Ag.) W. Sm. var. *tenuis* (W. Sm.) Grun. In stream from Great Geyser, mean temp. 40° C.

52. *Nitzschia Palea* (Kütz.) W. Sm. Hveravellir, temp. 38° and 49° C.

Var. *fonticola* Grun. Hveravellir, temp. 55° C.

53. *Nitzschia communis* Rabenh. Hveravellir, temp. 55° C. In stream from Great Geyser, mean temp. 40° C.

54. *Nitzschia amphibia* Grun. With the preceding species.

55. *Melosira distans* Kütz. var. *nivalis* (W. Sm.) Van Heurck. Hveravellir, temp. 24° and 55° C.

56. *Melosira crenulata* Kütz. Hveravellir, temp. 49° C.

II.—Algæ from a Hot Spring in the Malay Peninsula.

A short time ago, Mr. R. H. Yapp, of Caius College, Cambridge, very kindly forwarded to me a bottle of algæ obtained from a hot spring at Sira Rimau, in the Malay Peninsula, during the Skeat Expedition in 1899–1900. The spring was sulphurous, and the temperature of the water was 39·5° C. The material consisted principally of a new species of *Symploca*, which I have the honour to name after its discoverer. Amongst this was a species of *Phormidium*, also new, and a single species of Diatom.

Myxophyceæ.

1. **Symploca Yappii,** sp. n. (figs. 21–24). Fasciculato-cæspitosa, æruginea vel ærugineo-viridis. Fasciculis densis, tortuosis, repentibus, 2 cm. altis, ad apicem penicillatis, ad basin agglutinatis. Filis simplicibus, elongatis, densissime aggregatis et agglutinatis, basin versus contorto-intricatis, superne parallelis, arcte congestis. Vaginis delicatissimis et diffluentibus. Trichomatibus ærugineo-cæruleis, ad geniculis non constrictis; cellulis subquadratis vel diametro paullo longioribus, 1·8–2·4 μ longis; dissepimentis conspicuis, non granulatis; cellula apicalis rotundata, vix attenuata. Crass. trich. 2 μ.

This plant somewhat resembles *S. Meneghiniana* Kütz., a species of this genus found in hot springs in Italy, but is distinguished at once by the much narrower trichomes with thinner and more delicate sheaths, and by the shorter cells. From *S. thermalis* (Kütz.) Born. & Flah., a species also found in hot springs in Europe and Africa, it is distinguished by the much larger tufts, simple filaments,

and much shorter cells, the transverse walls of which are clearly visible.

Many of the tufts of *S. Yappii* were of a red colour, especially towards their apices. This was due to the presence of a red *Micrococcus* attached to the exterior of the filaments.

2. **Phormidium orientale,** sp. n. (figs. 25–27). P. strato tenuissimo, pallide ærugineo; filis subrectis vel leviter flexuosis, angustissimis, plus minusve intricatis; vaginis hyalinis, arctissimis, delicatissimis et non mucosis; trichomatibus læte ærugineis, angustissimis, ad dissepimenta non constrictis, apicibus rectis et non capitatis; cellulis diametro $3\frac{1}{4}$–$4\frac{1}{2}$-plo longioribus, protoplasmate homogeneo. **Crass. trich. 1·6–1·8** μ.

This small species of *Phormidium* somewhat resembles *P. angustissimum* West & G. S. West, but is more than twice the thickness, and the cells are relatively shorter. It occurred in quantity, forming an extremely thin, somewhat loose stratum on the outside of the tuft-like masses of *Symploca Yappii*. The dissepiments between the cells are fairly distinct, and the cell-contents are quite homogeneous. The sheaths are extremely thin and hyaline, but are easily seen at such places where the trichome has escaped. The apical cells are cylindrical, with rounded ends. It is readily distinguished from *P. tenue* (Menegh.) Gomont and *P. laminosum* (Ag.) Gomont.

3. *Diatoma elongatum* Ag. var. *Ehrenbergii* (Kütz.) Van Heurck. Rather scarce among the two preceding algæ.

DESCRIPTION OF PLATE 439.

Figs. 1–10. *Aulosira thermalis*, sp. n., × 520.
,, 11–16. *Mastigocladus laminosus* Cohn, × 520.
,, 17–20. *Calothrix parietina* Thur. var. *thermalis*, var. n., × 520.
,, 21–24. *Symploca Yappii*, sp. n. 21, nat. size; 22–23, × 520; 24, × 830.
,, 25–27. *Phormidium orientale*, sp. n. 25–26, × 520; 27, × 830.
,, 28–30. *Oscillatoria proboscidea* Gomont, var., × 520.

GLAMORGANSHIRE PLANTS.

By Rev. E. S. Marshall, F.L.S., and W. A. Shoolbred, F.L.S.

The species mentioned below were observed mainly about Porthcawl, Pyle, and Port Talbot, on June 7th and 10th of last year. We believe that this interesting coast would repay further search. "New county records" for v.-c. 41 are starred.

Aconitum Napellus L. Abundant and certainly indigenous for several miles in the valley of the Ely River, between Ely and Llantrissaint.

**Brassica Cheiranthus* Vill. In considerable quantity, a little south of Port Talbot, associated with *B. Sinapioides* Roth; looking like a native, but we know too little of the neighbourhood to form

a decided opinion. The root-leaves vary much in the breadth of their segments. Stems erect, 2–3 feet high, more or less hispid below.

Polygala oxyptera Reichb. Limestone coast between Porthcawl and Sker; a peculiar variety with deep green, glossy leaves, flowers usually blue, and short, crowded fruiting racemes.

Erodium cicutarium L'Hérit. var. *glandulosum* Bosch. Maritime sands, Sker; associated with the type and *E. maritimum*.

Anthyllis Vulneraria L. var. *coccinea* L. (*A. Dillenii* Schultz). Porthcawl to Sker.

**Callitriche pedunculata* DC. Port Talbot. — **C. obtusangula* Le Gall. In the stream between Pyle and Port Talbot.

[*Anaphalis margaritacea* Benth. & Hooker fil. Kenfig Burrows, about a mile away from houses.]

**Erythræa capitata* Willd. Coast between Porthcawl and Sker. New to Wales.—*E. littoralis* Fr. grows near Kenfig Pool; together with *E. Centaurium* Pers., its var. *capitata* Koch, and puzzling intermediates, which may be hybrids.

**Limosella tenuifolia* Hoffm. (*L. aquatica* var. *tenuifolia* Hook. fil.). A very full description, taken from our specimens, will be found in *Journ. Bot.* 1901, pp. 337–8; the figure (tab. 426*c*) is, however, extremely bad. Probably Mr. Hiern is right in identifying *L. tenuifolia* Nutt. with Hoffmann's plant; the original description of which (*Deutschlands Flora*, ii. 29) may be worth quoting:—"Distinguenda: *L. tenuifolia*, fol. linearibus, vix apice dilatatis, scapis fol. æqualibus, brevioribus. Wolf. Locis humidis (Svevofurt, Wolf. *M.D.*) fl. Aug. (Minutissima vix uncialis plantula, fol. angustissima. Cal. 5-fidus. Stam. 4)." This agrees admirably with our Kenfig Pool plant, which grew in the greatest profusion for about three hundred yards, and was quite monotypic; a few robust specimens collected by W. A. S. on July 12th are two inches in height, having been manured by cow-droppings. The contrast with ordinary British *L. aquatica* is most marked, not only in the absence of leaf-blades and the tiny blossoms, but also in the *pale yellowish-green* colour; in fact, we quite failed at the time to see any close resemblance to the Surrey form, with which one of us is familiar. Its early flowering season is an important point; on June 7th well-formed capsules were already present, so that it must have begun to flower about mid-May. The fact that *L. aquatica* sometimes produces linear as well as spathulate leaves is inconclusive; and it is noteworthy that Bentham—certainly no "splitter"—formerly allowed *L. tenuifolia* Nutt. specific rank (*Prodromus*, x. p. 427), though he added:—"Forte L. aquaticæ varietas sed folia semper angustiora videntur, pedicelli ratione foliorum vulgo longiores."† We have not yet been able to revisit the spot in autumn, which is desirable.

**Euphrasia brevipila* Burnat & Gremli. Margam Burrows, near Port Talbot.

† The Editor, however, points out that in *Fl. Austral.* iv. 503 (1869) Bentham combined Nuttall's plant with *L. aquatica*.

**Nepeta Cataria* L. Hedge-bank, north of Kenfig Church; hardly more than a denizen here.

Marrubium vulgare L. Near the south end of Margam Burrows; having the appearance of a true native, and remote from houses.

Littorella juncea Berg. Kenfig Pool; abundant.

Polygonum Bistorta L. Meadows between Pencoed and Llantrissaint.

Euphorbia portlandica L. and *E. Paralias* L. Kenfig Burrows, in plenty.

Salix alba* L. Stream between Pyle and Port Talbot, looking truly wild, as does *S. triandra* L.—S. triandra* × *viminalis* (*S. hippophaefolia* Thuill.). Determined by Rev. E. F. Linton. Growing beside the same stream; gathered for *S. alba* × *triandra*, which it clearly cannot be.—**S. Caprea* L. Margam Burrows, on the border of the marshes.

Epipactis palustris Crantz. Margam Burrows.

**Orchis latifolia* L. Kenfig Burrows; frequent in damp ground. **O. incarnata* L. also occurs sparingly.

Iris fœtidissima L. Kenfig and Margam Burrows, scarce; a curious place for this usually calcicole species.

Asparagus officinalis L. Sker sands; unquestionably native.

Scirpus pauciflorus Lightf. Near Kenfig.

Carex disticha Huds. Margam Moors. — *C. paniculata* L. Swampy wood bordering on these marshes; which also produce *C. acutiformis* Ehrh. and a small form of *C. riparia* Curt. — **C. Leersii* F. Schultz (*C. muricata* var. *pseudodivulsa* Syme). Sandy hedgebanks near Pyle; determined by Pfarrer Kükenthal, who writes that it is "readily separable [*i.e.* from *C. contigua* Hoppe, our *muricata*] by the interrupted spike; but, above all, by the truncate top of the leaf-sheaths and the much broader ligule. It is fairly frequent in North and Central Europe."

**Glyceria declinata* Bréb. (*G. plicata* var. *depauperata* Crépin). Port Talbot.

ALABASTRA DIVERSA.—Part IX.

By Spencer Le M. Moore, B.Sc., F.L.S.

Dr. Rand's* Rhodesian Rubiaceæ.

Crossopteryx Kotschyana Fenzl. Bulawayo, May. No. 415.

Oldenlandia rhodesiana, sp. nov. Annua, parvula, caule ascendente filiformi sparsim folioso scabriusculo, foliis quam internodia brevioribus anguste lineari-lanceolatis linearibusve summis revera filiformibus obtusis brevissime petiolatis glabris membranaceis, stipulis brevibus lacerate 2- (vel 3- ?) setosis, floribus minimis in cyma terminali folia excedente laxa erecta ter trichotoma scabriuscula dispositis, calycis scabriusculi lobis 4 parti inferiori æqui-

* Dr. Rand's collections are all in the National Herbarium.

longis subulatis erectis, corollæ ad $\frac{1}{5}$ lobatæ extus microscopice scabriusculæ tubo calycis lobos plus quam duplo superante deorsum filiformi sursum subito tumescente ibique intus puberulo limbi lobis oblongo-ovatis obtusis, antheris inclusis, ovario subhemisphærico, stylo sursum levissime incrassato.

Hab. Salisbury, December. No. 122.

Stirps 15·0 cm. alt. attingens. Radix tenuissima, breviter ac debiliter fibrillifera. Folia usque ad 2·0 cm. long., 0·2–0·4 cm. lat. (summa modo 0·02 cm. lat.); petioli circa 0·1 cm. long. Cyma 4·0 cm. long. Pedicellus floris primoris 0·5 cm. long.; flores reliqui subsessiles vel admodum sessiles. Calycis lobi vix 0·15 cm. long. Corollæ tubus 0·35 cm. long., deorsum 0·03 cm. diam., pars inflata vix 0·15 cm. long., et 0·08 cm. diam.; limbi lobi 0·07 cm. long., in sicco atrati. Antheræ 0·07 cm. long. Stylus 0·1 cm. long., rami hujus 0·05 cm. long. Capsula 0·25 cm. long., 0·35 cm. lat., obscure scabriuscula.

Known by the slender habit, minute flowers, corolla-tube swollen in its upper half, included stamens, &c.

Owing to their early disintegration I have been unable to get a satisfactory view of the stipules.

O. Bojeri Hiern. Salisbury, July. No. 474.

O. thymifolia (*Hedyotis thymifolia* Presl. nec H. B. K. nec Ruiz & Pav.). Bulawayo, May and December. Nos. 121, 369, and 369*bis*.

O. papillosa K. Schum. Salisbury, December. No. 120.

O. angolensis K. Schum. Gwelo district, December. No. 119.

Tricalysia jasminiflora Benth. & Hook. fil. Bulawayo, September. No. 637.

"Flowers white. A handsome bush and very striking, there being no leaves at time of flowering."—Rand MS.

Pentanisia sericocarpa, sp. nov. Verisimiliter perennis, pauciramosa ramis ascendentibus subteretibus striatis puberulis cito glabris, foliis subsessilibus inferioribus oblongo-ovatis superioribus oblongis vel oblongo-linearibus omnibus obtusis vel obtuse acutis glabris in sicco læte viridibus, stipulis deorsum petiolis adnatis sursum integris vel 2–3-fidis segmentis subulatis, cyma abbreviata densiflora, calycis dense sericei lobis majoribus 1–2 ipsum tubum paullulum excedentibus lineari-subulatis, corollæ lilacinæ tubo extus puberulo sursum sensim amplificato lobis 4–5 oblongis obtusis, antheris breviter exsertis, stylo apice trifido.

Hab. Salisbury, September. No. 619.

Planta ex exemplario unico fere 20·0 cm. alt. Folia 2·0–3·0 cm. long., latiora paullo ultra 1·0 cm. lat., angustiora circa 0·5 cm. Stipularum segmenta circa 0·1 cm. long. Cyma in toto 3·0 cm. long. et totidem diam. Calycis tubus 0·15 cm. long., lobi majores circa 0·25 cm. long., minores angustissimi, circa 0·1 cm. long. Corollæ tubus 1·0 cm. long., deorsum 0·1 sub limbo 0·25 cm. diam.; limbi circa 1·0 cm. diam. lobi 0·45 cm. long.; fauces pubescentes. Filamenta glabra, 0·25 cm. et antheræ vix 0·2 cm. long. Stylus 1·0 cm. long., glaber, ejus rami lineares, inæquales vel subæquales,

0·1–0·15 cm. long. Fructus immaturi subsphæroidei, sericei, 0·2 cm. diam.

Nearest *P. ouranogyne* S. Moore, a north-east tropical species, from which its shorter and relatively broader leaves, short calyx-lobes, shorter corolla with broader lobes and stumpy style-arms are the chief distinguishing points.

Pentanisia rhodesiana, sp. nov. Humilis, perennis, caule gracili erecto mox glabro, foliis parvis subsessilibus oblongo-lanceolatis obtusis vel acutis glabris in sicco læte viridibus, stipulis petiolis brevissime adnatis ambitu ovatis integris vel 2–3-fidis, cymis pluri- et densifloris, calycis pubescentis lobis majoribus lanceolatis calycis tubum bene excedentibus, corollæ lilacinæ tubo extus puberulo sursum subito campanulatim dilatato lobis 5 abbreviatis oblongis obtusis, antheris inclusis subsessilibus, stylo breviter exserto apice bifido.

Hab. Salisbury, September. No. 575.

Planta circa 8·0 cm. alt. Folia 1·0–1·5 cm. long., 0·3–0·5 cm. lat. Stipularum pars libera circa 0·2 cm. long. Cymæ in toto 1·5–2·0 cm. long. et diam. Calyx 0·1 cm. long.; lobi majores sæpissime 0·2–0·3 cm. long., minores subulati, circa 0·12 cm. long. Corollæ tubus 0·9 cm. long., deorsum 0·08 cm. faucibus 0·2 cm. diam.; limbi circa 0·5 cm. diam. lobi 0·3 cm. long.; fauces pubescentes. Filamenta vix 0·1 cm. et antheræ 0·13 cm. long. Stylus 1·1 cm. long., glaber; ejus rami recurvi, circa 0·1 cm. long.

This looks very much like the plant just described, but examination reveals important differences in the clothing of the calyx, in the shape of the corolla-tube, length of corolla-lobes and filaments, and number of style-arms. These differences seem too pronounced and affect too many organs to justify the suspicion that we have to do here with two states of the same species.

Canthium lanciflorum Hiern. Salisbury, July. No. 552.

"A medium-sized tree. No leaves at time of flowering."—Rand MS.

Vangueria Randii, sp. nov. Fruticosa, præter inflorescentiam glabra, ramulis gracilibus abbreviatis, foliis petiolatis lanceolato-oblongis obtusis nonnunquam cuspidulatis basi cuneatis in sicco læte viridibus subtus glaucescentibus, stipulis e basi amplificata lineari-setaceis mox deciduis, cymis axillaribus sæpius oppositis paniculiformibus plurifloris pubescentibus quam folia brevioribus, calycis usque basin partiti lobis anguste lineari-oblongis obtusis maturitate recurvis vel saltem patentibus, corollæ ad medium partitæ lobis lanceolatis caudato-acuminatis mox reflexis utrinque glabris, antheris subsessilibus tubo corollæ subinclusis, ovario subgloboso pubescente 5-loculo, stylo corollæ tubo æquilongo, stigmate apice 5-lobo deorsum truncato.

Hab. Bulawayo, early January. No. 123.

Folia petiolo excluso 3·0–7·0 cm. long., 1·5–3·0 cm. lat.; costæ secundi ordinis utrinque 3–6, nunc ascendentes nunc leviter arcuatæ; petioli modici 0·5 cm. long., rarissime fere 1·0 cm.

attingentes. Stipulæ 0·6 cm. long. Cymæ circa 2·0 cm. long., divaricatæ et tunc fere 4·0 cm. diam., vel simpliciores et modo 1·5 cm. diam. Pedunculus communis circa 0·7 cm. et pedicelli 0·4–0·5 cm. long. Calycis lobi 0·35 cm. long., 0·1–0·13 cm. lat. Corolla in toto 0·8 cm. long.; tubus 0·3 cm. lat., extus glaber, intus annulo pilorum deflexorum instructus. Ovarium 0·2 cm. long. et lat. Stylus deorsum paullo incrassatus.

Nearest *V. lasiantha* Sond., and distinguished from it by the thinly membranous green leaves, smaller flowers, shorter calyx-lobes not at all spathulate, shorter corollas not divided beyond the middle and glabrous outside, subsessile subincluded anthers, and shorter style.

Fadogia stenophylla Welw. var. rhodesiana var. nov. Folia abbreviata, obovato-oblonga, obtusissima, 1·5–2·0 cm. long., plerasque 1·0–1·2 cm. lat., in sicco læte viridia. Salisbury, September. No. 629.

This has a markedly different look from the type, chiefly on account of the short and broad bright green leaves. The flowers are very slightly larger than those of the type, and the calyx-lobes slenderer and not all of them developed sometimes. There are, however, intermediate forms at Kew from Nyassaland.

Dr. Rand notes: "The flowers are cream-coloured, with a slightly waxy effect."

Anthospermum Randii, sp. nov. Suffruticosa, stricta, pauciramosa, ramis strictis crebro foliosis subquadratis patule pubescentibus foliis sessilibus lineari-oblongis indurate acutatis marginibus valde revolutis supra scabris subtus patule pubescentibus dein costa centrali exempta fere glabris in sicco griseis, stipulis simplicibus deorsum petiolis adnatis a basi amplissima subulatis, floribus nunc hermaphroditis nunc fœmineis illis pentameris his tetrameris omnibus sessilibus, corollæ hypocraterimorphæ mox deciduæ tubo attenuato pubescente limbi lobis lanceolato-oblongis acutis tubo æquilongis, staminibus fll. hermaph. 4 corollæ faucibus insidentibus breviter exsertis, stylo quam ejus rami multo breviore, fructus coccis oblongis deorsum levissime angustatis introrsum sulcatis albo-setulosis.

Hab. Salisbury, July. No. 475.

Folia modica circa 1·5 cm. long., sæpe modo 1·0 cm., raro usque ad 3·5 cm. elongata, in sicco (i.e. involuta) 0·1–0·3 cm. lat., rigide patula vel ascendentia; stipulæ pars libera 0·15 cm. long. Fll. hermaph. tubus 0·3 cm. long., limbus 0·5 cm. diam.; fll. fœm. tubus 0·23 cm. long., limbus 0·3 cm. diam. Filamenta vix 0·2 cm., antheræ 0·22 cm. long. Stylus glaber, circa 0·07 cm. long., rami 0·4 cm. long., deorsum complanati, sursum filiformes necnon undique papillosi. Cocci 0·3 cm. long., 0·12 cm. lat., brunnei.

With somewhat the look of *A. pachyrrhizum* Hiern, this comes nearest *A. ternatum* of the same author. Its pecularities are the stout habit, the broader scabrous leaves, the broader corolla-tube, the very short styles terminated by much longer arms, &c.

The corollas have already disappeared for the most part, and I was able only to find the two which have been described above.

Anthospermum rigidum E. & Z. Bulawayo, May. No. 338.

Dr. Rand's Rhodesian Asclepiadeæ.

Raphionacme lanceolata Schinz var. *latifolia* N. E. Br. Bulawayo, early January. No. 284.

Exactly like the type except for the broader leaves.

Xysmalobium gramineum, sp. nov. Verisimiliter humilis, caule gracili erecto rariramoso pubescente deinde glabro, foliis elongatis anguste linearibus vel linearibus acutis cito omnino glabris basi in petiolum brevem desinentibus margine revolutis, cymis interpetiolaribus umbelliformibus circa 10-floris quam folia brevioribus, bracteis setaceis, pedicellis quam flores longioribus una cum pedunculis et bracteis minute pubescentibus, floribus parvis, calycis lobis lanceolatis acutis extus pilosulis, corollæ rotatæ fere ad basin partitæ lobis erecto-patentibus sursum recurvis lanceolato-oblongis quam calycis lobi longioribus, coronæ squamis 5 basi gynostegio adnatis oblongis obtusis carnosis quam gynostegium multo brevioribus adjectis dentibus 5 minutis, polliniis pyriformibus quam caudiculæ paullo longioribus, glandula anguste oblonga.

Hab. Bulawayo, early January. No. 193.

Specimen unicum 10·0 cm. alt. Folia 4·5–6·5 cm. long., 1·5–4·0 cm. lat.; petioli 0·2–0·4 cm. long. Pedunculi circa 1·5–2·5 cm., bracteæ 0·3 cm., pedicelli 0·5 cm. long. Flores modo 0·4 cm. diam. Calycis lobi 0·2 cm., corollæ lobi 0·3 cm., coronæ squamæ 0·07 cm., gynostegium 0·17 cm. long. Pollinia 0·05 cm. long. et caudiculæ 0·04 cm. Stigma vertice convexiusculum.

Distinguished by its lowly habit, narrow grass-like leaves, small flowers, and short corona-scales.

Schizoglossum strictissimum, sp. nov. Caule elato strictissimo sat valido rari- (et tunc breviter) ramoso deorsum nudo sursum folioso minute pubescente deinde puberulo in longitudinem multistriato tereti, foliis sessilibus in sicco erectis anguste linearibus obtuse acutis inferioribus quam superiora multo longioribus omnibus minute pubescentibus marginibus revolutis firme membranaceis, cymis pluribus interpetiolaribus paucifloris sessilibus, pedicellis quam flores parvi brevioribus pubescentibus, calycis lobis lanceolatis acutis piloso-pubescentibus corolla brevioribus, corollæ lobis oblongo-ovatis obtusis extus pilosis intus piloso-pubescentibus, coronæ squamis basi gynostegio adnatis necnon id paullo superantibus ambitu obovato-rotundatis intus prope apicem dentibus 2 minutis auctis sursum in appendicem brevem debilem cuspidatam supra gynostegium inflexam transeuntibus, polliniis ovoideo-oblongis quam caudiculæ longioribus, glandula lineari, folliculis sursum attenuatis minute pubescentibus.

Hab. Bulawayo, December. No. 195.

Planta circa metralis. Caulis 0·2–0·3 cm. diam., basi paullulum incrassatus. Folia inferiora 6·0–6·5 cm. long., superiora 2·0–3·0 cm., illa in sicco (sc. marginibus revolutis) circa 0·2 cm. lat., hæc

0·07–0·1 cm. Pedicelli modo circa 0·1 cm. long., pubescentes. Flores virides, 0·5 cm. diam. Calycis lobi 0·2 cm., corollæ lobi fere 0·3 cm. long., hi 0·2 cm. lat. Coronæ squamæ (appendice exclusa) 0·1 cm. long., 0·13 cm. lat.; appendix 0·05 cm. long. Pollinia 0·025 cm., caudiculæ 0·015 cm. long. Stigma apice planum. Folliculi 8·0 cm. long., deorsum circa 1·3 cm. lat., sursum usque ad 0·25 cm. imminuti. Semina anguste oblongo-ovoidea, rugosa, vix 0·5 cm. long.; coma 3·5 cm. long.

Distinguished by its strict habit, pubescence, erect leaves, sessile cymes with small flowers, pubescent corolla and broad cuspidulate corona-scales minutely 2-toothed within.

Asclepias Randii, sp. nov. Verisimiliter humilis caule gracili mox ramoso, ramis foliosis piloso-pubescentibus, foliis sessilibus anguste linearibus acutis quam internodia multoties longioribus piloso-pubescentibus, cymis umbellatis pauci(3–4-)floris a foliis bene superatis ex axillis summis oriundis una cum bracteis setaceis quam pedicelli brevioribus pedicellisque ipsis piloso-pubescentibus, calycis lobis lanceolatis acutis pubescentibus, corollæ lobis patentibus ovato-oblongis obtusis membranaceis viridibus extus pubescentibus, coronæ squamis deorsum concavis uninervibus intus inappendiculatis et in nervo papillosis et linea transversa pubescente onustis 3-lobis lobis lateralibus brevibus erectis oblongis gynostegii apicem haud attingentibus lobo intermedio laterales multo excedente patenti linguiformi gynostegium bene superante, antherarum marginibus in alam cartilagineam subquadratam expansis, appendice hyalina sursum inflexa, polliniis oblique pyriformibus compressis quam caudiculæ juxta se ipsa parum dilatatæ longioribus, glandula lineari-oblonga.

Hab. Salisbury, Dec. No. 194.

Exemplarium unicum 12·0 cm. alt. Folia 5·0–6·0 cm. long., 0·12–0·17 cm. lat., firma, omnia in sicco ascendentia. Cymæ 3·0 cm., pedunculi 1·0–2·0 cm., pedicelli circa 1·0 cm. necnon bracteæ 0·5 cm. long. Calycis lobi fere 0·5 cm., corollæ lobi 0·5 cm., coronæ squamæ in toto 0·7 cm. harum pars concava 0·3 cm. et lobi laterales 0·15 cm. long., lobus intermedius 0·4 cm. long., marginibus sæpe involutis. Antherarum alæ 0·1 cm. lat., vix 0·2 cm. long. Pollinia 0·1 cm. long.

This very distinct plant has much the look of *Asclepias gibba* (*Gomphocarpus gibbus* Dcne.), but the leaves are narrower, the flowers smaller, the terminal lobe of the corona-scales is longer relatively to the basal concave part, and stands out patently from the gynostege, &c.

A. fruticosa Linn. Shangani river, eighty miles north of Bulawayo, early January. No. 191.

A. glaucophylla Schlechter. Salisbury, December. No. 185.

A. aurea (*Gomphocarpus aureus* Schlechter). Gwelo district, early January. No. 188.

Var. BREVICUSPIS var. nov. A typo discrepat ob coronæ phyllarum lobum terminalem quam is typi breviorem (sc. 0·2 cm. long.) et paullo latiorem. Salisbury, September. No. 638.

A. eminens (*G. eminens* Harv.). Salisbury, December; Bulawayo, early January. Nos. 183, 189.

A. lineolatus (*G. lineolatus* Dene.). Bulawayo and Salisbury, December. Nos. 184, 186.

A. concolor Schlechter. Bulawayo, December. No. 187.

Margaretta Whytei K. Sch. Salisbury, September and December. Nos. 124, 547, 632.

Cynanchum præcox Schlechter, *in litt.*, sp. nov. Perpusilla, erecta, caule carnosulo præter squamas perpaucas parvulas nudo sursum pauciramoso puberulo, ramis perbrevibus comparate validis puberulis, cymis terminalibus plurifloris, pedicellis comparate elongatis ac revera floribus parvulis multo longioribus filiformibus puberulis, calycis intus basi minute 5-glandulosi lobis oblongo-ovatis obtusis puberulis, corollæ rotatæ usque ad ¾-partitæ lobis quam calyx longioribus triangulari-oblongis obtusis patentibus marginibus undulatis, coronæ squamis in tubum breviter 10-lobum gynostegium excedentem connatis iis staminibus oppositis apice rotundatis deorsum squamella rotundata auctis squamis reliquis paullo longioribus et angustioribus necnon intus nudis, polliniis oblongo-pyriformibus quam caudiculæ sat pingues subhorizontales glandulæ anguste oblongæ basi insertæ paullo longioribus.

Hab. Valley of Mazoe River, Salisbury district, September. No. 512.

Tota planta modo 2·5 cm. alt. Caulis 1·5 cm. long., circa 0·2 cm. diam. Pedicelli 0·3–0·7 cm. long. Flores verisimiliter virides. Calycis lobi 0·2 cm., corollæ tubus 0·15 cm., lobi 0·43 cm. long., hi prope basin 0·2 cm. apicem versus 0·13 cm. lat. Coronæ tubus circa 0·2 cm. alt.; lobi longiores 0·16 cm. long., horum margines involutæ; lobi breviores 0·1 cm. long. Gynostegium circa 0·13 cm. long. Pollinia 0·03 cm., caudiculæ 0·01 cm. long. Stigma breviter conicum.

"This Asclepiad springs in little tufts close to the ground."—Rand MS.

Mr. Schlechter, to whom Mr. Britten sent a specimen of this curious little plant, acknowledged the receipt on a post-card, with the name given as above. The description was to follow "in a day or two," but, owing doubtless to pressure of work, it never came to hand. Mr. Schlechter being away from Europe, it has been thought desirable to include this among Dr. Rand's other *Asclepiadeæ*.

Sarcostemma viminale R. Br. Bulawayo, May. No. 363.

"—— often quite smothering its support with a maze of cords." Rand MS.

(To be continued.)

HIERACIUM ANGLICUM Fries AND ITS VARIETIES.

By Frederic N. Williams, F.L.S.

In an attempt to group the British Hawkweeds, the critical examination of the many forms of the species found to occur in Central Europe recorded in *Die Hieracien Mittel-Europas* (so far as published) by Naegeli and Peter, and exemplified in their excellent series of specimens issued under the supervision of Prof. Peter as *Hieracia Naegeliana exsiccata*, affords a healthy stimulus to the revision of the fewer forms met with in other countries. The present paper is therefore tentative and, as it were, introductory, taking up *H. anglicum* as a well-known British species. The group of *Cerinthoidea*, as represented in this country, does not include typical members of the group, and many forms referred to it must probably find a place elsewhere. In a recent paper in this Journal a few points were touched on, and a further examination of specimens of *H. callistophyllum* tends to show that it would, perhaps, be better transferred to *Oreadea*.

H. anglicum *Fries*, Symb. Hist. Hierac. p. 93 (1848).—Rhizoma lignescens, fibras longas emittens. Caulis 3–5 decim., erectus firmus, simplex vel superne corymbose ramosus, dividens in pedunculos longos adscendentes arcuatos, pilosus (vel interdum subglaber). Pedunculi pilis albis basi nigrescentibus etiam setis brevibus nigris vestiti. Folia (radicalia) 3–6, ovata vel ovato-lanceolata, petiolata, acuta vel acuminata, dentata vel interdum subintegra, in petiolum longum anguste alatum hirsutum contracta; supra glauca subglabra, subtus parce pilosa, margine villosa; folia caulina 1–2, uno superiore semper bracteiformi lineari. Calathia pauca (vel in pl. culta plura), 35–55 ctim. diam. Periclinium ventricosum basi rotundatum, setosum et pilosum, griseo-fuscum; squamæ olivaceæ vel nigrescentes, adpressæ acuminatæ, interiores pallescentes, exteriores indumento parce floccoso vestitæ. Ligulæ pallide luteæ. Styli lividi. Cypsela 3 mm. longa, fusco-rubra, longitudinaliter sulcata. Pappus cremeus, 6 mm. longus, pilis minutis asper.

α genuinum *Syme*, Engl. Botany, ed. 3, v. p. 180, t. 836 (1866). Folia (radicalia) ovalia vel elliptica, longe petiolata, denticulata vel subintegra; caulina vix amplexicaulia.

Stat. Sides of streams and cliffs in mountainous districts, on basalt and mica-slate; ascends to 810 metres in Aberdeenshire, and 510 metres in Donegal.

Hanbury, Monogr. p. 68, t. 24; *Linton*, exs. no. 57 (Ben-na-bourd, in Aberdeenshire).

β acutifolium *Backh.* Monogr. Brit. Hierac. p. 37 (1856). Folia (radicalia) serrato-dentata anguste oblonga acuminata brevius petiolata, serraturâ argutâ latâque. Caulis magis ramosus.

Hab. Perthshire: Cliffs of Ben Laoigh (ex *White*, Fl. Perthsh.); Allt Dubh Ghalair, Glen Lochay (*E. S. Marshall*). Angus: at Dornallt, Glen Dole, in the Clova district, at 720 metres (*I. H. Burkill*, 1896, in Herb. Kew.). Aberdeenshire: Braemar (*E. G.*

Baker, 1893, in Herb. Brit.); near Castleton, banks of the Clunie (ex hb. *W. Gardiner*, 1845, in Herb. Brit.); Cairntoul, in the Cairngorm Mountains (*Backhouse*, 1852, in Herb. Kew., and 1855, in Herb. Brit.); Braemar (*Linton*, exs. n. 58). Inverness-shire: Isle of Skye (*Oliver*, 1867, in Herb. Kew.). Sutherland: Coldbackie (*E. S. Marshall & W. A. Shoolbred* in Journ. Bot. 1898, p. 171). Sligo: Glenade Cliffs (*Barrington & Vowell* in Proc. Roy. Irish Acad. 1885). Antrim: Sallagh Braes (*Stewart*). Down: by the Shimna River above Tollymore Park, and by the stream on Luke's Mountain (*Stewart & Praeger*, 1892).

γ JACULIFOLIUM *F. J. Hanb.* in Journ. Bot. 1892, p. 168. Folia jaculiformia, folio caulino haud sessili, in petiolo longo recto suffulto. Caulis quam in typo minus pilosus. Periclinii squamæ floccoso-marginatæ. Ligulæ abnormales (forma stylosa).

Hab. A plant apparently confined to the English Lake District. Cumberland: Ghyll, in Kirk Fell (*W. B. Waterfall*, 1884); crevices of Rock Wren Gill slate-quarry, and ledges of limestone rock at the Force, on the stream between Shap (in Westmoreland) and Anna Well (*J. A. Martindale*, 1888); wet rocks in Ghyll, at the back of Kirk Fell, Ennerdale, at 600 metres (*H. E. Fox*, 1888); Dolly-waggon Pike, at 820 metres (*H. E. Fox*, 1890); Walton Craig, Keswick (*Linton*, exs. n. 104). Westmoreland: Fairfield, on Dove Crag, at 750 metres (*H. E. Fox*, 1890). Mr. Hanbury further says: "There appears to be no example of this form in Mr. Backhouse's herbarium. It is noteworthy that it is usually, if not always, associated with the ordinary form of *H. anglicum*, and may possibly be a hybrid, but of this we have as yet no sufficient proof."

δ LONGIBRACTEATUM *F. J. Hanb.* in Journ. Bot. 1889, p. 75. Habitu gracilior. Folia intense glauca utrinque glabra. Periclinium griseum pube stellata vestita, bracteis longe attenuatis subtentum.

Hab. N. Scotland, to Reay in Caithness (*J. Grant*, 1888); many points along the north coast, and in Inverness-shire at Sgorr-na-Insse and Stob Ban (*Linton*, exs. n. 31); also in Antrim (*W. A. Shoolbred*).

ε CALCARATUM *E. F. Linton fratt.*, exs. Hierac. n. 126, et in Journ. Bot. 1901 (Mar.), p. 105. Folia radicalia late ovalia, primordialia suborbicularia. Caulis griseus aphyllus (vel interdum folio uno petiolato angusto instructus). Periclinii squamæ floccoso-marginatæ, quam in typo minores. Pedunculi cano-floccosi.

Hab. Limestone cliffs near Kendal, Westmoreland; and the west borders of Brecknock.

ξ AMPLEXICAULE *Backh.* in *Bab.* Man. Brit. Bot. ed. 5, p. 203 (1862). Folia radicalia ovalia vel elliptica longe petiolata, denticulata vel subintegra; caulina (pauca) basi amplexicaulia.

Hab. Scottish Highlands, and Benbulben, in Sligo (*Linton*, exs. n. 80 is from Coire Coille, Glen Spean, in Inverness-shire).

This was the plant described by Syme as *H. anglicum* var. *decipiens*, which is a misleading name; as in De Candolle's *Prodromus*, vii. p. 230, Frölich states that *H. decipiens*—i. e. *H. cerinthoides* var. *decipiens* Monnier—is the *H. cerinthoides* of English floras.

η HARTII *mihi* : = H. CERINTHIFORME var. HARTII *Hanb.* in Journ. Bot. 1892, p. 169 ; *More*, Cyb. Hibern. ed. 2, p. 202 (1898). Folia caulina 3–5 amplexicaulia, integra vel denticulata. Periclinii squamæ molliter pilosulæ.

Hab. Slieve League, in Donegal (*H. C. Hart*, 1885).

θ BREVIFURCATUM *mihi*. Folia primordialia late ovalia basi haud attenuata; folia radicalia exteriora elliptica remote serrata, interiora ovato-lanceolata margine parce denticulato-apiculata, omnia supra subglabra subtus breviter pilosa. Caulis superne breviter tenuiterque furcatus. Calathia 3–5. Periclinium 12–13 mm., ovato-ventricosum.

This is the plant which has been distributed under the name of *H. bifidum* Kit. It is common on alpine rocks in Carnarvonshire, whence it has been distributed by Rev. A. Ley. Mr. Hanbury proposed for it the name of *H. Leyi*, but has not given a description of it, beyond attributing to the plant ciliated ligules and darkened styles, which exclude it from the group of *Oreadea*, in which it is placed in the last edition of the *London Catalogue*.

To *H. anglicum* should, I think, also be referred *H. Langwellense* and *H. Carenorum* (nos. 923 and 928 in the last edition of the *London Catalogue*). With regard to *H. Langwellense*, the short description says: "Approaching *H. anglicum* Bab., but differing from it in the blunter, shorter, less porrect phyllaries, subglabrous ligules, and in the radical leaves, which are broader at the base and abruptly decurrent." The authentic specimens in Herb. Brit. are those issued by Messrs. Linton (exs. n. 60), gathered at Lybster, near Wick, in Caithness, and at Glen Spean, in Inverness-shire. An examination of the specimens shows, however, that not only are the leaves narrow at the base, and *not* abruptly decurrent, but that the lower portion of the leaf is narrower and the blade more gradually attenuated into the petiole than in many typical specimens of *H. anglicum*. The scales of the pericline are certainly somewhat shorter and more arrect in apposition, but scarcely distinctive in character. I have not seen the specimens from the Moffat Hills, in Dumfriesshire, mentioned by Messrs. Linton in Exs. fasc. 3. Then, as to *H. Carenorum*, the description given in Journ. Bot. 1894, p. 227, is almost word for word included in that of *H. anglicum* given on the last page (so far as published) of Mr. Hanbury's monograph, except that the scales are paler. Messrs. Linton also state, in a note to Exs. fasc. 6, that their no. 83, issued under the name of "*H. Carenorum*" at Mr. Hanbury's suggestion, turns out to be a form of *H. argenteum*. Unfortunately, in these, as in other descriptions of British specimens, important specific characters such as are relied on by Naegeli, Peter, Burnat, Celakovsky, and Hermann Zahn, for separation of groups, are omitted or overlooked. Nothing is said of the structure of the pits of the common receptacle, the relative length of the acladium, the position and direction of the cladophore, be it of the main axis or of a secondary stem, whether the furcation is determinate or indeterminate, and whether it evolves upwards or downwards. Dr. M. Elfstrand regarded the clothing of the pericline as a noteworthy specific character,

giving it undue prominence to the exclusion of others, in which, however, those who have studied the Central European forms of this difficult genus do not follow him. In the few specimens, with very hairy scales, which I have examined, the structure of the inner microtrichal surface, under a good lens, does not seem uniform and constant on different heads of the same plant.

JOHN CLAVELL MANSEL-PLEYDELL, F.G.S., F.L.S.

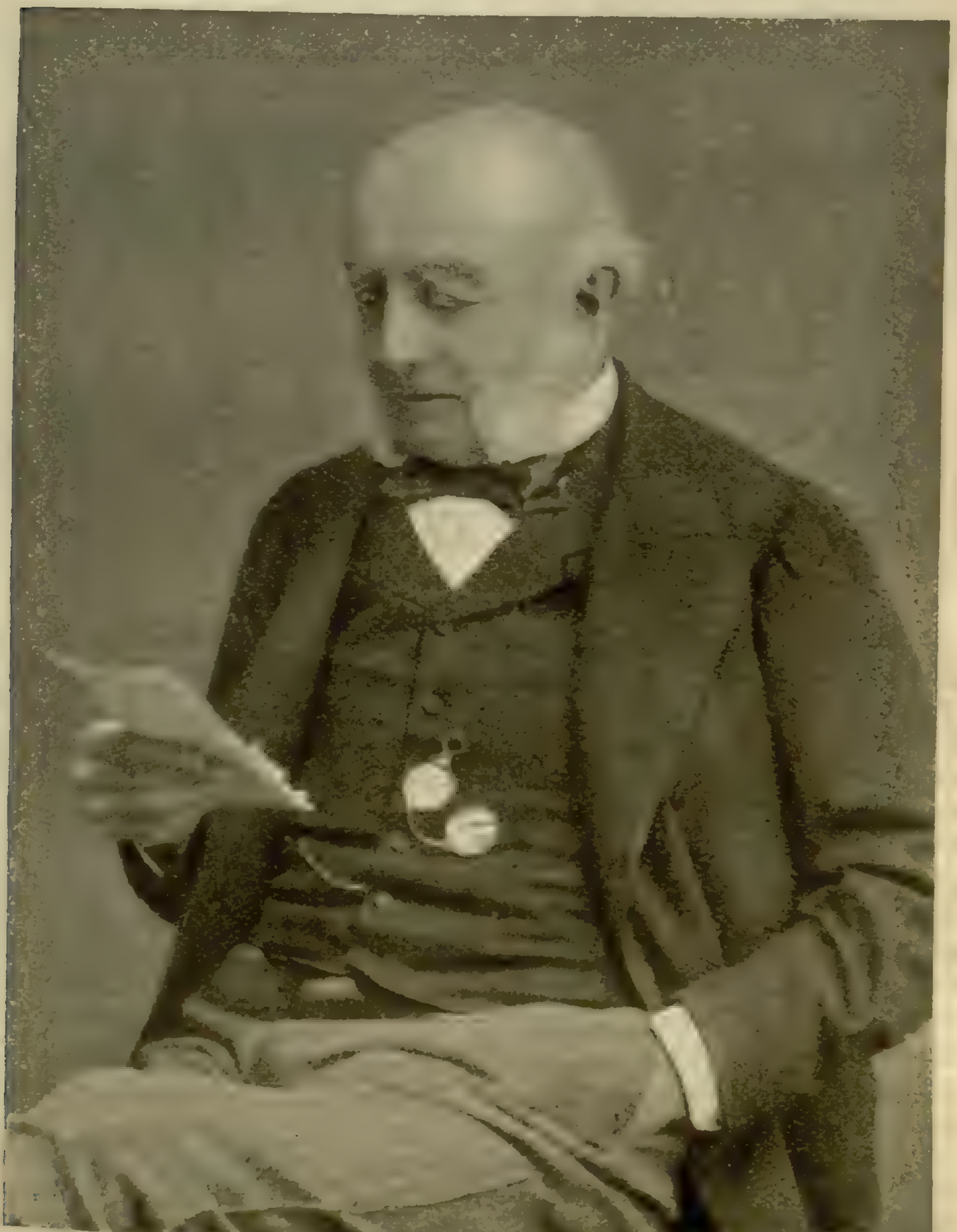
(With Portrait.)

Any one who knew J. C. Mansel-Pleydell as a botanist might be pardoned for thinking that his chief interest lay in this branch of Natural History, so keen was he as an observer himself, and so warmly did he welcome any one who was interested in the Flora of Dorset. He was, however, remarkable as a many-sided man, even in an age when many-sided men are not uncommon; and moreover threw as much interest into any subject or project that he was engaged in, as many do into their pet hobby. His knowledge of Geology exceeded considerably his knowledge of Botany; while his *Birds of Dorset* and his *Mollusca of Dorset* show no mean acquaintance with two departments in Zoology.

Descended from a family which includes such names as Philip Mansel, who came over with William I.; Robert Mansel, whose valour in an assault during the Crusades is commemorated by the Mansel-Pleydell crest—a cap of maintenance in flames; Sir John Morton, whose portrait heads the long series of family portraits at Whatcombe,—he was the first of his race to rise to eminence in scientific pursuits. Born on Dec. 4, 1817, his taste for Botany and Natural History was early implanted by his mother; but he used to attribute the development of this taste to the Rev. Henry Walter, Rector of Haselbury Bryan, previously Fellow of St. John's, Cambridge, and a Professor of Natural Philosophy, under whose tuition he was placed before going up to Cambridge (St. John's Coll., B.A., 1839).

This interest in botany was further increased as time went on by intimacy or frequent correspondence with Sir William Hooker, H. C. Watson, H. Trimen, and others, and by some acquaintance in the field, during a stay at Montpellier, with M. Planchon and other French botanists. His first botanical publication was the *Flora of Dorset* (1874), in which he recorded several species added to the county by himself. Of these, *Helleborus fœtidus*, *Raphanus maritimus*, *Geranium pyrenaicum*, *Galium sylvestre*, *Valerianella eriocarpa*, *Erythræa pulchella*, *Bartsia viscosa*, *Polygonum mite*, *Ceratophyllum demersum*, *Malaxis paludosa*, *Allium oleraceum*, *Potamogeton acutifolius*, *Scirpus nanus*, *S. Caricis*, *Eriophorum latifolium*, *Carex strigosa*, *C. lævigata*, *Polypogon monspeliensis*, *Glyceria Borreri*, *Agropyron pungens*, *Lastræa Thelypteris*, and *L. cristata* will sufficiently testify to his splendid powers of observation and industry. One

might say zeal, for on hearing of the rediscovery of *Parnassia palustris* in the county, lost since Pulteney's time, he at once mounted and rode all the way to Corfe Castle, to get Canon Bankes to guide him to the spot. At the age of eighty he travelled from Whatcombe to Wareham to be shown the newly found *Leersia oryzoides* and the newly restored *Lemna gibba* (which Bell Salter



had reported without locality). Stimulated by the successful researches of newcomers into the district, notably his friends the Revs. W. Moyle Rogers and R. P. Murray, and the addition by them of many critical species, Mr. Mansel-Pleydell printed in 1895 a second edition of the *Flora of Dorset*, his own contributions to which included *Lavatera sylvestris*, *Leucojum vernum*, *Potamogeton alpinus*, *P. decipiens*, *Sparganium neglectum*, and *Carex curta*.

His first contribution to this Journal appeared in 1866, when (as J. C. Mansel) he gave an account of the occurrence of *Leucojum vernum* in Dorset; his last, on *Arum italicum* as a Dorset plant, appeared in 1900, and between these dates he published many notes. During his visits to London he was frequently at the Natural History Museum, and a welcome visitor to the Department of Botany, with whose officials, present and past, he was on terms of friendship. His essays, however, for the most part saw the light in the *Transactions* of the Dorset Nat. Hist. and Antiquarian Field Club, a flourishing institution which owed its existence in great measure to himself. Its President from the first, for over a quarter of a century (1875–1902), he enriched the *Transactions* with presidential addresses giving a vast amount of geological information and a masterly survey of current geological progress and discovery, as well as with important monographs on the Dorset *Trigoniæ*, and on the Fossil Reptiles of the county, and descriptions of his own discoveries.

To the County Museum at Dorchester Mr. Mansel-Pleydell was a life-long contributor. One of its principal founders, he deposited in its keeping most of his geological finds, and the results of his archæological researches and investigations; and he leaves it by will his extensive British and European herbaria.

It might be supposed that a country gentleman who followed his varied tastes in Natural History so keenly, a student in several of its branches and an author in most of those he studied, would have found little leisure and less inclination for the manifold duties that the Church, the county, and a large estate look for from men in his position. The owner of an extensive domain, lord of the manor in three parishes, he lived an unselfish and unostentatious life, devoting large sums to the improvement of his estates, which are models of order; whilst in the face of poor returns he spent much on the rebuilding of the labourers' cottages and showing practical sympathy with the working classes living on his property. What his tenantry and neighbours thought of him came out in the summer of 1899, when he and Mrs. Mansel-Pleydell celebrated their golden wedding; expression was then given to "the feelings of sincere regard and appreciation of the active, useful life he had spent in furthering the best interest of all classes, and the unfailing sympathy and fair dealing that always animated his relations with his tenants."

The county could hardly honour enough a man who undertook office so readily and fulfilled the duties—of Guardian, County Councillor, Chairman of Parish Council, Vice-Chairman of the Blandford Bench, Captain of the Dorset Yeomanry—so efficiently. One of his best claims to the county's gratitude—his country's one might fairly say—was the building in 1856 of the Boys' Reformatory at Milborne, to the supervision of which he devoted an enormous amount of time and attention, raising it to a remarkable state of efficiency.

The immense respect in which he was held was reflected in the great concourse of people who gathered in the churchyard at

Clenston on the day of his funeral—people of all classes, not a tithe of whom could be accommodated in the village church. To some it was the sympathy of a common pursuit that appealed, and the energy, the delight, and the patience with which he followed out his researches. To far more it was the kindliness of the man, the goodness, the genial look of interest, whatever the special link might be that attracted mingled admiration and affection. "His face and presence and manners (I am quoting from an appreciation published in a local paper by Mr. R. Bosworth Smith) were a passport in themselves. He was greater and better in himself than in anything he either said or did, abounding in benevolence, intensely human, loyal, loving, genial, humorous; he preserved to the end of his life the freshness, the vigour, the intensity, the simplicity, the sweetness of a child, combining it with the mature judgment, the wide knowledge, the ripe experience, the rapt insight into the life beyond the grave, of a departing saint who already saw Heaven opened."

Prof. Newton, F.R.S., who was frequently with him twenty to thirty-five years ago, while Mr. Mansel-Pleydell was collecting materials for his *Birds of Dorset*, writes from Cambridge, that, at the time when he was nearly overwhelmed with the liabilities he had incurred in connection with the unfortunate Somerset and Dorset Railway, "the calmness with which he bore up against what at one time seemed the prospect of utter ruin was very remarkable." He adds: "The simplicity of his character and the almost boyish ardour of his pursuit of Nature made his society, to me at least, most attractive, and I feel that I have in him lost a really good friend."

Such ardour characterized him to the end. He was attending the Salisbury Synod less than a fortnight before his death; and was on his way to a meeting of the Dorset Field Club at Dorchester on the 2nd May, when the fatal attack seized him to which he succumbed next day.

E. F. Linton.

SHORT NOTES.

Gloucestershire and Monmouth Plants.—The undermentioned species were observed by us in June, 1901, chiefly in the neighbourhood of Stroud and Chepstow, a few being gathered in the company of the Rev. Augustin Ley. New records are starred. V.-c. 33, E. Gloster:—*Helleborus fœtidus* L. Woods near Pitchcombe; native.—*Lepidium Draba* L. Abundant, with *Crepis taraxacifolia* Thuill., in a sown grass-field above Stonehouse.—*Polygala oxyptera* Reichb. and *P. calcarea* F. Schultz. Summit of a down, between Randwick and Harescombe.—*Stellaria umbrosa* Opiz. var. *decipiens* E. S. Marshall. Harescombe.—*Onobrychis viciæfolia* Scop. Downs above Stroud and Pitchcombe; truly wild.—*Antennaria dioica* R. Br. Two patches, on a down above Pitchcombe.—*Hieracium murorum* L. var. *pellucidum* Laest. Plentiful about Stonehouse and Pitchcombe.—*Atropa Belladonna* L. Downs between Randwick and

Harescombe; Pitchcombe Wood.—*Poa compressa* L. Downs near Harescombe.—**Glyceria plicata* Fr. Near Stonehouse.—*Lolium perenne* L. var. *tenue* L. Beechwood, near Pitchcombe; in company with *Hordeum sylvaticum* Huds., which also occurs in Pitchcombe Wood.—*Phegopteris calcarea* Fée. In two stations about half a mile apart; near Pitchcombe. V.-c. 34, W. Gloster:—*Viola Riviniana* × *silvestris*. Wood near Tidenham; sterile.—*Rosa obtusifolia* Desv. var. *frondosa* Baker and *R. stylosa* Desv. var. *systyla* (Bast.). Wood near Tidenham.—**Callitriche obtusangula* Le Gall. Pool near the Severn, south of Sedbury Park, with *Ranunculus hederaceus* L. *var. *omisphyllus* (Ten.).—*Luzula Forsteri* × *vernalis* (*L. Borreri* Bromf.). Symonds Yat; where we also found *Festuca rubra* L. var. *fallax* Hackel (*F. fallax* Thuill.). V.-c. 35, Monmouth:—*Viola Riviniana* × *silvestris*. Wynd Cliff; sterile.—*Polygala oxyptera* Reichb. Mounton Valley, near Chepstow.—**Cerastium tetrandrum* Curt. Coast, Portskewett.—**Salix decipiens* Hoffm. (*teste* Linton). Stream-side, Mounton Valley; probably, though not certainly, *S. fragilis* × *triandra*.—Edward S. Marshall; W. A. Shoolbred.

Hypochœris glabra L. in Herefordshire. — I met with this species in fair quantity, on June 5th, on the western slopes of the Malvern Hills, in the parish of Colwall (Dist. 4, *Flora of Herefordshire*). It has long been known on the eastern (Worcestershire) side of the hills, but had not hitherto been gathered in Herefordshire.—Richard F. Towndrow.

Bromus interruptus in North Hants. — My attention was first called in the year 1900 to scattered clumps of a grass three or four feet high, of a dark green colour, rising far above the other grasses, clover, vetches, and other crops in which it grew, in arable fields round Odiham, in North Hants. This June I observed it growing in a field of vetches, and sent it to Mr. G. C. Druce, who identifies it as his *Bromus interruptus*. I believe it has only been found previously in the county by Mr. A. B. Jackson, and that further south.—Charlotte E. Palmer.

NOTICES OF BOOKS.

Books for Students.

A University Text-book of Botany. By Douglas Houghton Campbell, Ph.D., Professor of Botany in the Leland Stanford Junior University. Large 8vo, pp. xv, 579, with 15 plates and 493 figures. New York: The Macmillan Co. (Macmillan, London). 1902. Price 17s.

Practical Botany for Beginners. [Second Edition.] By F. O. Bower, Sc.D., F.R.S., and D. T. Gwynne-Vaughan, M.A. Small 8vo, pp. xi, 307, with 31 figures in the text. London: Macmillan Co. 1902. Price 3. 6d.

Botany. By G. T. Bettany, M.A., B.Sc. Small 8vo, pp. vi, 127, with 75 figures in the text. London: Ward, Lock & Co. [1902.] Price 1d.

The higher text-book of botany—the general treatise embodying all the more important phases of the science, for the use of advanced students—is out-of-date. It is analogous with the professor of natural history, who presumes to profess several sciences to only one of which, being but human, he can possibly attend. Botany is a big subject, in which specialization has received full recognition, —except as regards the higher text-book. It is important that the student, before he proceeds to specialize, should have a good general knowledge of the science; but it is not necessary that such knowledge should be derived from one book. The labour attending the preparation of such a work must be enormous, and quite out of proportion to any kind of remuneration which is likely to accrue. We cannot afford to let men with high ability for research, and power of application of results like Professor Campbell, spend months to years of their life in the compilation of a general text-book. If we must still have such a volume, let us follow the scientific principle of differentiation of labour, as was done in one of the best of its kind, that for which Prof. Strasburger and his colleagues of Bonn University were responsible.

There are fifteen chapters in Professor Campbell's book. The first is introductory; the second and third, entitled the Plant-body and the Plant-cell respectively, occupy about fifty pages, and represent general morphology. There is no general account of internal structure, a serious omission, which is not adequately supplied by the brief description of the internal structure of the members in the various great groups in subsequent chapters. The stelar theory is nowhere discussed, a remarkable oversight, for, whatever may be said for or against it, it certainly has the merit, like the "evolution" hypothesis, of co-ordinating a number of facts. Chapters iv. to xii. deal with the special morphology and classification of the great plant groups. The subdivision of the Algæ is based on the arrangement given in Engler & Prantl's *Pflanzenfamilien*, and the author does not take account of the recent work which has led to considerable modification in the treatment of the *Chlorophyceæ*. The arrangement of the Fungi is that of Brefeld. In the *Archegoniatæ* (Chapters vii. to ix.) the author is more at home, and gives a useful account of the subdivisions of the section. In the Bryophytes he recognizes three groups, Anthocerotales forming the third, intermediate between Bryophytes proper (Musci and Hepaticæ) and the Pteridophytes. The division of *Filicinæ* is into *Eusporangiatæ* and *Leptosporangiatæ*, but reference is made to the affinity of *Osmundaceæ* with the former group.

The account of the Gymnosperms is less satisfactory. Recent researches have brought to light several points in the anatomy of the vegetative organs, which are of much interest in phylogeny. These are unnoticed. The anatomy of the leaf of *Pinus* is thus described: "In the middle of the leaf are the two vascular bundles, closely resembling those of the stem. The xylem is turned towards the upper side of the leaf. Surrounding the two bundles is a large oval area (in section), sharply separated, by a definite row of cells, from the green mesophyll." The bundles of the petiole in *Cycas*

"show a group of small spiral tracheids near the centre, outside of which is a mass of large scalariform tracheids. The rest of the bundle is composed of the phloem." All we learn about the seminiferous scale is that it "has been much discussed, but it is probably to be considered as an outgrowth of the sporophyll, perhaps comparable to the placenta of the Angiosperms." The formation of the embryo of Conifers is dismissed in less than six lines. The orders of Angiosperms are arranged on the system adopted in the *Pflanzenfamilien*. They are extensively illustrated, but the accompanying text is very scanty. *Liliaceæ*, for instance, has only six lines. It would have been more serviceable if a few families had been treated in greater detail, omitting reference to many which are included. To include *Podostemaceæ* among *Rosales* as "aquatics of very peculiar structure, sometimes resembling algæ rather than vascular plants" with no further explanation does not help to the better understanding of the group. A short chapter on Physiology is followed by two useful chapters, one on relation to environment, and another, the concluding one, on geological and geographical distribution.

At the end of each chapter is a bibliography. The book is profusely illustrated, and many of the figures are new, and made by the author expressly for the work. The full-page plates illustrating various plant-habits are prepared from photographs, and deserve special mention.

Professor Bower's excellent little practical manual is so well known that no teacher of botany is likely to regard the present issue as anything but a new edition, though it would have been as well for the benefit of the librarian and recorder to have stated the fact on the title-page. In the preparation of the new work the original author has had the help of his assistant at Glasgow University, Mr. Gwynne-Vaughan. The most notable addition is the inclusion of the study of the naked-eye characters of twenty-two types of flowers representing the commoner natural orders of Angiosperms, in order that the student may become acquainted with the external characters as well as the internal structure of the reproductive organs—a very important object. The floral plan is illustrated by Eichler diagrams, apropos of which, for the benefit of the denser student, attention should have been drawn to the fact that the diagram does not always refer to the same genus as is described in the text. Some additional examples are also included in other portions of the work, but the general arrangement is that of the earlier edition.

Mr. Bettany died in 1891, and perhaps it is for this reason that the publishers have printed no date on the cover or title-page. Mr. Fennings' wonderful cures for children's ailments, advertised on the back cover, must date back still further, and so will furnish no clue for the future cataloguer. We believe the book to be a cheap reprint of an elementary text-book, not at present to hand, which was formerly, and may be is still, much used in girls' schools, and was one of the best of its kind. It deals merely with the

simpler facts of the morphology and physiology of seed-plants, and is certainly not a bad pennyworth.

A. B. R.

Algues Vertes de la Suisse. Pleurococcoïdes-Chroolépoïdes.
Par R. Chodat.

This volume forms the third fascicle of the first volume of *Matériaux pour la Flore Cryptogamique Suisse*, published on the initiative of the Société Botanique Suisse. It contains 373 pages, and is illustrated by 264 figures in the text. The author states in the preface that his intention was to write, not a new catalogue of all *Chlorophyceæ* recorded in Switzerland, but a book which would serve as a guide to students approaching a new branch of botany. Hitherto information on freshwater algæ has had to be sought in lists, incomplete books, and isolated papers. M. Chodat would embrace within his one volume such information as he has gained from personal experience and from the works of others, especially as regards the development of the individual plants. Being convinced of the necessity for studying the polymorphism of species of fresh-water algæ in order to arrive at a true definition of the species limits, he has devoted much time and attention to the biological side of the subject. His notes are therefore of great interest and value.

In the Introduction the author tells us he wished at first to include all the families of the green algæ, but as this was impossible through lack of time, he confines himself to the *Euchlorophyceæ*. In some cases, where his knowledge of a species was limited to Swiss specimens, he has preferred to treat of these rather than to quote information of which he had no personal experience. Thus certain families are more fully dealt with than others. *Palmellaceæ*, *Volvocineæ*, *Protococcoideæ*, and *Pleurococcaceæ* are treated with the completeness of monographs, since these families are well represented in Switzerland, and the author has consequently been able to study them in detail. But he points out that even in the cases where only Swiss specimens have been studied, the facts would hold good for such species all over the world; and since the fresh-water flora of Switzerland is not very different from that in any other part of the world, "a treatise on Swiss algæ is useful both in Japan and Paraguay."

M. Chodat divides his book into four parts:—*A*. Collection and preservation of fresh-water algæ. *B*. Morphology, in which he treats, under separate headings, of Protoplasm, Vacuoles, Flagella, Stigma, Chromatophore, Pyrenoid, Nucleus, Membrane, Pluricellular Thallus, Hairs and Bristles, Rhizoids, and Organs of Attachment, Organs of Multiplication. *C*. Biology, under the headings of Light, Temperature, Nutrition, Tropism, Classification according to Biology, Parasitism, Symbiosis, Holophytes, Aquatic Limnophils, Plankton, Cryoplankton, Dispersal. *D*. Classification. Lists of bibliography are given. Under this last division he treats the *Pleurococcoideæ* with *Schizogonioideæ* and the *Chroolepoideæ*. This occupies 246 pages of the book, and is a most valuable contribution

to algological literature. Many keys to genera are given, and a certain number of new species are described. For details of classification it is indispensable to study the book itself.

E. S. G.

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*ARTICLES IN JOURNALS.**

Botanical Gazette (15 May).—K. Miyaké, 'Starch of evergreen plants.'—F. C. Newcombe, 'Rheotropism of roots.'—J. B. Overton, 'Parthenogenesis in *Thalictrum purpurascens*' (2 pl.).—T. D. A. Cockerell, *Heliotropium xerophilum*, sp. nov.

Botanical Magazine (Tōkyō).—J. Matsumura, 'Leguminosæ of Japan' (cont.).—T. Makino, 'Flora of Japan' (cont.).

Bot. Zeitung (16 May).—H. Vochting, 'Ueber die Keimung der Kartoffelknollen' (2 pl.).—(16 June). C. van Wisselingh, 'Untersuchungen über *Spirogyra*: zur Kenntniss der Karyokinese' (1 pl.).

Bull. de l'Herb. Boissier (31 May).—A. Chabert, 'Les *Euphrasia* de la France' (concl.).—R. Chodat & E. Wilczek, 'Contributions à la Flore de la République Argentine' (cont.).—H. Christ, 'Spicilegium pteridologicum austro-brasiliense' (cont.). — Id., *Gymnogramme Fauriei*, sp. n.

Bull. Soc. Bot. France (xlviii, 7; 7 June). — L. Géneau de Lamarlière & J. Mahen, 'La flore bryologique des grottes du Midi de la France.'—H. Hua, 'Le Genre *Neurotheca*.'—H. de Boissieu, '*Sisyrinchium mucronatum* dans l'Asie.'—H. Joseph, 'La flore d'Auvergne en 1901.'—L. Lutz, 'Nutrition des Thallophytes à l'aide des amides.' — E. Malinvaud & H. Joseph, '*Carex Grioleti* Roem.' (t. 9). (xlix. 3, 4: 29 May. — C. E. Bertrand & F. Cornaille, 'La pièce quadruple des Filicinées et ses réductions.' —Id., 'Les caractéristiques de la trace foliaire maratienne, ophioglosséene et onocléene.'—F. Gagnepain, 'Zingiberacées nouvelles' (*Costus*).—E. Mouillefarine, '*Viola cornuta*.'—F. Camus, *Hymenophyllum tunbridgense*.—G. Dismier, *Frullania fragilifolia*.

Bullettino della Soc. Bot. Italiana ("Feb. Marzo," received 11 June).—E. Barsali, 'Prime muscinee del Livornese.'—H. Christ, 'Végétation de la Riviera di Levante.'—A. Trotter, 'Teratologia vegetale.'—("Aprile," received 11 June).—N. Terracciano, 'Il genere *Eclipta* nella Flora Italiana.'

Bull. Torrey Bot. Club (26 May).—V. S. White, *Nidulariaceæ* of N. America' (5 pl.). (*Nidula*, gen. nov.).—M. A. Howe, 'American Hepaticæ.'—D. Griffiths, 'West American Fungi.'—E. S. Salmon, 'Notes on Erysiphaceæ' (concl.).

Gardeners' Chronicle (31 May). — J. Hoog, *Tulipa nitida* & *T. Micheliana*, spp. nn. (figs. 119, 129).—(7 June). *Platyclinis barbifrons* Kränzlein, sp. n. — Sir M. Foster, *Iris buchowica*, *I. Warleyensis*, spp. nn. (figs. 134, 135).

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* The dates assigned to the numbers are those which appear on their covers or title-pages, but it must not always be inferred that this is the actual date of publication.

Malpighia (xv. fasc. 10–12, received 21 June).—P. Voglino, 'Sopra una malattia dei Crisantemi coltivati' (1 pl.).—G. Zodda, 'Revisione monographica dei Delfinii e dei Meliloti italiani.'—E. Pantamelli, 'Sull' albinismo nel regno vegetale' (1 pl.).—P. A. Saccardo, 'Iconoteca dei Botanici.'—G. D. Ippolito, 'Anatomia comparata del caule delle Magnoliacee.'

Nuovo Giorn. Bot. Italiano ("Aprile": received 11 June).—G. Zodda, 'Sul genere *Serapias*.'—C. Zanfrognini, 'Contribuzione alla Flora lichenologica dell' Emilia.'—G. Bargagli-Petrucci, 'Rivista del genere *Conocephalus*' (8 pl.).

Oestern. Bot. Zeitschrift (June).—S. Prowazek, 'Zur Kerntheilung der *Plasmodiophora Brassicæ*.'—A. Hansgirg 'Biologie der herabgekrümmten Laubblatter der *Aralia ipathulata* & *Meryta Senfftiana*.'—R. Wagner, *Roylea elegans* (cont.).—A. Jenčič, 'Der Bastfasern der *Thymelæaceæ*' (concl.).—J. Freyn, 'Plantæ Karoanæ' (cont.). — Hackel, 'Neue Gräser.' Hieronymus Gander (1832–1902).

BOOK-NOTES, NEWS, &c.

At the meeting of the Linnean Society on June 5th, Dr. Otto Stapf exhibited the original specimen of *Trifolium albidum* Retz., from Retzius's herbarium at Lund, together with specimens collected by Mr. J. Lawson in a dock at Falmouth in 1900, representing a variety of *T. albidum* which was in cultivation in various botanic gardens on the Continent in the early part of the last century, and at Kew as late as 1856, the origin of which is, however, not known. Retzius's specimen proves that his *T. albidum* (1786) is identical with *T. squarrosum* Savi (1808–1810), non Linn., *T. panormitanum* Presl (1826), and *T. longestipulatum* Loisel. (1828). Hence it follows that the name *T. albidum* takes precedence before those names as well as *T. dipsaceum* Thuill. (1790), which was identified by Grenier & Godron and by Rouy with Savi's *T. squarrosum*. The colour of the corolla is, as Retzius describes it, whitish with a tinge of yellow or, as Savi says, of red; in dry specimens it turns to a dirty yellow or brown more or less suffused with purple. The calyx is 10-nerved, not, as Koch stated, 20-nerved. The Falmouth variety is—apart from the glabrous calyx-tube—identical with De Candolle's *T. ochroleucum* var. *ramosum* (Fl. Franç. v. p. 529 (1805)), which the author referred subsequently (Fl. Franç. Suppl. p. 557 (1815)) to *T. albidum* Willd. (*sic*). It agrees, indeed, very well with the plant so named in Willdenow's herbarium (no. 14220), and, according to a communication by M. Cas. De Candolle, with the specimens on which Séringe evidently based his *T. squarrosum* var. *flavicans* (syn. excl.). The name proposed for this variety is *T. albidum* var. *ramosum* Stapf. It is mainly characterized by the low growth, small, mostly elliptic leaflets, and straw-yellow flowers. The calyx-tube varies from glabrous to rather conspicuously hairy; the same is the case in *T. albidum* proper, although here specimens with perfectly glabrous calyx-tubes are very rare.

At the same meeting, Mr. H. H. W. Pearson read a paper "On certain species of *Dischidia* with double pitchers," illustrated by specimens and lantern-slides. He stated that four species of *Dischidia* were dealt with, viz. *D. complex* Griff. (Malacca), *D. pectenoides* H. H. W. Pearson (Philippines), and two undescribed species from Borneo; these all possess double pitchers. The inner pitcher is to be regarded as being formed by the involution of the apex of the leaf, which in the simple pitcher of *D. Rafflesianum* hangs free in the pitcher. The outer pitcher of the double-pitchered forms contains solid matter and roots. Ants were present in two of them. The opening into the outer pitcher is 2 mm. in diameter, and therefore not large enough to allow of the washing-in of solid matters by rain: they seem to be carried in by ants; this marks a degree of myrmecophily which is an advance upon that shown by *D. Rafflesianum*. Roots are absent from the inner pitcher. In *D. pectenoides* a large number of small, irregularly shaped sweet masses are present in the inner pitcher; these arise from gummosis of the tissue above the opening of the inner pitcher. A fungus-mycelium is present on the surface of the inner wall of the outer pitcher, the hyphæ of which abstrict gemmæ which perhaps serve as food for ants.

On the same occasion Prof. Percival read a paper on "Silver-Leaf Disease in Plums and other Pruneæ." The peculiar ashy-grey colour of the leaves of trees suffering from the so-called "silver-leaf" disease is due to the development of intercellular spaces just beneath the cuticle of the leaves. The chloroplastids and other parts of the tissue of the leaves are very little different from those in normal specimens. The author found the disease to be due to the attack of the fungus *Stereum purpureum;* the fungus is confined to the root of the diseased plants or lower underground portions of the stem; but apparently some deleterious substance, produced either directly by the fungus or by its action upon the tissues of the affected plant, is conducted through the stems to the leaves. Prof. Percival showed specimens of branches which he had artificially infected with *Stereum purpureum* ten or twelve weeks ago, the leaves of which were typically "silvered." The disease had travelled from the infection-wound upwards along the branch much more rapidly than downwards, and only along the side on which the wound was made were the leaves diseased at first, though the trouble now appears to be spreading to other leaves and spurs off the line drawn from the wound to the tip of the inoculated branches. Prof. Percival also gave an account of some observations upon the distribution and first appearance of crystals of calcium oxalate in Alsike (*Trifolium hybridum* Linn.) grown under various conditions.

The U.S. Department of Agriculture has issued a bulletin entitled "The Algerian Durum Wheats," the work of Mr. C. S. Scofield, expert on cereals. The grain of *Triticum durum*, which has a hard horny endosperm, is used chiefly for the manufacture of macaroni and similar paste foods. The bulletin deals with the spike and grain characters of some of the more important varieties now grown in a general or experimental way in Algeria, where the

author devoted three months to their study. The spikes and spikelets of about thirty forms are very nicely figured by a photographic process in a series of eighteen plates, accompanied by brief descriptions.

Mr. H. N. Dixon is preparing a new edition of the *Handbook of British Mosses*, and will be glad of any corrections or suggestions in order that the new issue may be made as complete and accurate as possible. His address is: Wickham House, East Park Parade, Northampton.

Mr. F. H. Davey, who has been working assiduously for the last two years at the Flora of Cornwall, has published a *Tentative List* (Penryn, Chegwidden) for the county, as a preliminary to a more complete Flora which he hopes to publish. Even as it stands, the enumeration is fuller than that of many county floras; the localities given are numerous, the authority for each being added, but the division of the county into districts is reserved for the complete work, the records at present running from east to west. The present volume is intended for those who will co-operate in making the Flora more complete, and for their benefit it has been printed only on one side of the page, the other being left blank for the entry of notes; workers can obtain copies of the list from the author, Ponsanooth, Perranwell Station, Cornwall. We would suggest that in the final form of the work the *London Catalogue* numbers should receive less prominence, and that most of the English synonyms should be omitted. Mr. Davey in his preface says, "After the specific name of the plant, a well-known English name is given"; but this description cannot apply to such phrases as "Long-bracteated Sedge," "Flat-stemmed Meadow Grass," "Narrow-leaved Hairy Wood Rush," and the like. The printing of the book is highly creditable to the local firm employed.

The most recent part of the *Icones Plantarum* contains an unusual proportion of interesting novelties, and includes the following new genera: *Carolinella* Hemsl. (Primulaceæ), *Hartia* Dunn (Ternstroemiaceæ), *Diuranthera* Hemsl. (Liliaceæ Asphodeleæ), *Thomassetia* Hemsl. (Ternstroemiaceæ), *Cryptotæniopsis* and *Carlesia* Dunn (Umbelliferæ Ammineæ), and *Paradombeya* Stapf (Sterculiaceæ).

A very handy little *Forest Flora* for the Saharunpur and Dehra Dún Districts has been "compiled for the use of students of the Imperial Forest School, Dehra Dún" by Upendranath Kanjilal, "Extra-assistant Conservator of Forests," and is published at the Government printing office, Calcutta. It seems very carefully done; the descriptions are based upon those in the *Flora of British India*; there is an introduction by Mr. J. S. Gamble, a glossary, and indexes of botanical, European, and vernacular names. The book is fairly well printed, bound in cloth, of a convenient size for the pocket, and remarkably cheap at its price of two shillings.

In the recent number of *Malpighia* (xv. fasc. 10–12, not dated) Prof. Saccardo publishes a supplement to the interesting list of portraits of botanists in the Istituto Botanico of Padua issued in vol. xiii. of the same journal (1899), pp. 89–123.

The part of *Minnesota Botanical Studies* issued in May contains the following papers: "Lichens of North-western Minnesota," by Bruce Finck; "Corallinæ veræ of Port Renfrew," by K. Yendo (6 plates); "Observations on *Pterygophora*," by Conway Macmillan (5 plates).

Under the title *Vegetationsansichten aus Deutschostafrika*, Herr Wilhelm Engelmann of Leipzig has lately published a very useful and interesting series of sixty-four plates reproduced from photographs taken by Her. Walther Goetze in 1898 and 1899, illustrating various aspects of East African vegetation. These views convey at a glance more information than can be supplied by pages of description, and their usefulness for educational purposes can hardly be overestimated. Among the more striking individual forms represented may be mentioned palms of different kinds, Euphorbias (*E. Stuhlmannii* must be a very striking figure in the landscape), *Sterculia appendiculata*, *Dracæna usambaremsis*, *Lobelia Volkensii*, *Cussonia spicata*, *Platycerium elephantotis*, *Juniperus procera*, *Erica kingariensis*, and many more. Professor Engler contributes a short account of the representations, and of the vegetation which goes to make up the general effect of the pictures. Schools as well as botanical institutions would do well to obtain this instructive collection.

Mr. Thomas Costley has published *Sketches of Southport* "and other poems," one of which is devoted to the flora of the neighbourhood. This includes

> "The cowslip, with a pearl in every ear,
> The harebell, beautiful in form and hue,
> The yellow iris, of its title proud,
> The primrose, fair enough to be a queen,
> Though simple as a peasant's cotton gown";

and also "rare plants"

> "That only in the richest soils are found—
> Valerian, bugloss, hounds-tongue, pimpernel,
> Loosestrife, anemone, angelica,
> Sundew, and meadowsweet, and betony."

Mr. Costley's favourite flower is *Vinca major*, whose praises he sings in six verses, each with the refrain

> "Hurrah for the peerless periwinkle!"

Correction.—By an inadvertence which we cannot explain, it was stated on p. 167 that Germany was unrepresented in the list of botanists appointed to serve at the Congress on Nomenclature to be held in Vienna in 1905. Five representatives have been appointed for that country.

Gepp : Barton. On the 9th June, at St. Luke's Church, Chelsea, by the Rev. Edward Gepp, M.A., of Felstead School, brother of the bridegroom, Antony Gepp, M.A., of the British Museum (Natural History), son of the Rev. Edward Francis Gepp, Vicar of High Easter, Essex, to Ethel Sarel, daughter of Alfred Bowyer Barton, M.D., F.R.C.S., &c., of 7, Brechin-place, South Kensington.—*Times*.

Ilfracombe); Dorset (Weymouth, Studland); Hants (Isle of Wight); Sussex (Brighton, Eastbourne); Kent (Dover); Essex (Harwich, Waton Creek); Norfolk (Cromer); Yorks (Filey, Scarborough, Whitby); Durham (Roker, Marsdon); Northumberland (Cullercoats, Alnmouth, Berwick); Cheshire (Hilbre Island, New Brighton); Isle of Man. Wales (Puffin Island, Anglesea, Menai Straits). Scotland: Haddington (Dunbar, North Berwick); Edinburgh (Joppa); Fife (Elie, Pittenweem, Anstruther); Forfar (Arbroath); Kincardine (Stonehaven); Aberdeen (Peterhead); Moray Firth; Orkney Islands; Argyle (Kirn); Bute (Isles of Arran, Cumbrae, and Bute); Ayr (Saltcoats). Ireland (Bantry Bay, Co. Cork; Ardmore Bay, Co. Waterford, &c.; widely distributed and abundant in spring and early summer). Channel Islands (Jersey, Guernsey, Alderney). Not uncommon.

E. oratus Kjellm. Coasts of Bute (Isles of Cumbrae and Arran). Rare.—*β arachnoideus* Rke. Coast of Devon (Ilfracombe). Rare.

E. Hincksiæ Harv. Coasts of Cornwall (Mount's Bay, Falmouth, Fowey, Looe); Devon (Ilfracombe, Plymouth, Exmouth); Dorset (Weymouth, Durlston Head, Swanage); Sussex (Brighton); Yorks (Filey). Wales (Anglesea, Towyn-y-Capel). Scotland: Kincardine (Bay of Nigg); Aberdeen (Peterhead, Aberdeen); Moray Firth; Caithness (Wick); Orkney Islands; Bute (Cumbrae); Ayrshire. Ireland (Ballycastle Bay, Co. Antrim, &c.). Not common.

E. Reinboldii Rke. Coast of Dorset (Weymouth). Very rare.

E. distortus Carm. Coasts of Argyle (Appin); Bute (Isles of Cumbrae and Arran); Ayr (Saltcoats, Ardrossan); Moray Firth (Campbeltown). Very rare. N.B.—This species has also been recorded from Torbay and Filey, but it is probable that some variety of *Pylaiella litoralis* was mistaken for it.

E. Landsburgii Harv. S.W. coast of Scotland: Argyle (Kyles of Bute); Bute (Isles of Cumbrae and Arran); Ayr (Largs, Ardrossan). Ireland (Roundstone Bay, Co. Galway). Very rare. N.B.—In his *Monograph of the Algæ of the Firth of Forth*, the late Mr. G. W. Traill states that this species was found at "Largo by Dr. Landsborough in August, 1853." This is a mistake; the specimens referred to were gathered at Largs, Ayrshire, not Largo, Fife, as is evident from one of the specimens now before me. The species has also been recorded from Sidmouth, but it is very doubtful whether the specimen was correctly identified.

E. acanthophorus Kütz. Coast of Dorset (Weymouth). Very rare.

E. granulosus Ag. Coasts of Cornwall (St. Minver, Mount's Bay, Falmouth, Fowey); Devon (Ilfracombe, Plymouth, Exmouth, Sidmouth); Dorset (Weymouth, Portland, Swanage); Hants (Isle of Wight); Sussex (Brighton); Kent (Deal); Essex (Harwich, Dovercourt); Norfolk (Cromer); Yorks (Filey, Whitby); Northumberland (Alnmouth, Holy Island, Berwick); Cheshire (New Brighton, Hilbre Island). Wales: Carnarvon (Bangor); Anglesea (Puffin Island). Scotland: Berwicks. (Burnmouth); Haddington (Dunbar); Edinburgh (Joppa, Caroline Park); Fife (Kinghorn, Earlsferry, Elie, St. Andrew's); Forfar (Arbroath); Kincardine

(Stonehaven, Torry); Aberdeen (Peterhead); Orkney Islands; Argyle (Appin, Falls of Lora, Firth of Lorne); Bute (Isles of Arran and Cumbrae); Renfrew (Gourock); Ayr (Ardrossan). Ireland (Bantry Bay, Co. Cork; Maugan's Bay, Co. Waterford; Kilkee and Spanish Point, Co. Clare; Belfast Lough, Ballycastle, Co. Antrim, &c.). Channel Islands (Jersey, Guernsey, Alderney, Sark). Common and abundant on most of the shores of the British Islands. — *β tesselatus* Harv. Coasts of Devon (Torquay); Dorset (Weymouth); Yorks (Filey); Northumberland (Berwick). Scotland (Joppa, Co. Edinburgh). Not uncommon. — *γ refracta.* Coast of Devon (Teignmouth). Scotland (Isle of Cumbrae and Irvine, Ayrshire). Rare.

E. secundus Kütz. Coasts of Devon (Torquay); Dorset (Weymouth). Scotland: Haddington (Dunbar); Edinburgh (Joppa); Fife (Elie, Earlsferry, Kinghorn); Bute (Isle of Cumbrae); Ayr (Fairlie). Ireland (Bantry Bay, Co. Cork). Rare.

E. fenestratus Berk. Coasts of Cornwall (Bude); Devon (Plymouth, Salcombe); Sussex (Brighton); Northumberland (Whitley). Very rare.

E. Lebelii Crn. (= *E. fenestratus* Holm. & Batt. Rev. List, Appendix). Coasts of Devon (Sidmouth) and Dorset (Swanage). Rare.

E. Padinæ Sauv. (= *Giffordia Padinæ* Buffham). Coast of Devon (Exmouth, Ladran Bay, Sidmouth). Rare.

Gen. 89. Sorocarpus Pringsh.

S. uvæformis Pringsh. Coast of Dorset (Weymouth). Scotland: Bute (Isle of Cumbrae); Renfrew (Gourock). Very rare.

Gen. 90. Pylaiella Bory.

P. litoralis Kjellm. *a opposita*, f. *typica* Kjellm. Coasts of Cornwall (Falmouth); Devon (Torquay, Sidmouth); Dorset (Weymouth); Northumberland (Berwick).—f. *subglobosa* Kuck. Devon (Torquay); Dorset (Weymouth, Swanage); Northumberland (Berwick). —f. *rupincola* Kjellm. Northumberland (Berwick).—f. *brachiata* Batt. (= *Conferva brachiata*, Sm. Eng. Bot. pl. 2571; *Ectocarpus brachiatus*, Harv. in Hook. Br. Fl. ii. p. 327, sed non Harv. Phyc. Br.). Coast of Norfolk (Cley, Caistor). Rare.—f. *longifructus* Batt. (= *Ect. longifructus* Harv. Phyc. Br. pl. 258). Coasts of Devon (Plymouth Hoe); Durham (Sunderland); Northumberland (Berwick). Scotland: Haddington (Dunbar); Orkney Islands (Skaill); Bute (Isle of Cumbrae); Ayr (Saltcoats). Rare.—*β firma*, f. *typica* Kjellm. (= *E. litoralis* Wyatt Alg. Daum. no. 129). Coasts of Cornwall (St. Minver, Mount's Bay, Falmouth, Looe, Whitsand Bay); Devon (Plymouth, Torquay, Exmouth, Sidmouth); Dorset (Weymouth, Portland, Swanage); Hants (Isle of Wight); Sussex (Bognor, Worthing, Brighton); Kent (Dover, Deal); Essex (Clacton, Dovercourt, Harwich); Suffolk (Felixstowe); Norfolk (Yarmouth, Cromer); Yorks. (Filey, Scarborough, Whitby); Durham (Sunderland); Northumberland (Alnmouth, Holy Island, Berwick); Isle of Man. Wales: Carnarvon (Bangor); Anglesea (Puffin Island). Scotland: Berwicks. (Burnmouth, Eyemouth);

Haddington (Dunbar, North Berwick); Edinburgh (Joppa); Fife (Kinghorn, Earlsferry, Elie); Forfar (Arbroath); Aberdeen; Kincardine (Stonehaven); Orkney Islands; Argyle (Oban, Appin, &c.); Bute (Isles of Arran and Cumbrae); Renfrew (Gourock); Dumbarton (Gare Loch); Ayr (Ardrossan). Ireland: Generally distributed. Channel Islands (Jersey, Guernsey, &c.). Common and abundant.—f. *parvula* Kjellm. Devon (Sidmouth). Rare. —γ *divaricata* Kjellm., f. *typica* Kjellm. (= *E. compacta* Auct.). Dorset (Weymouth, &c.); Northumberland (Berwick).—f. *ramellosa* Kuck (= *E. ramellosus*). Cornwall (Padstow). — δ *varia* Kuck (= *P. varia* Kjellm.). Coasts of Ross-shire (Invergordon), Bute (Isles of Cumbrae and Bute), Ayr (Saltcoats). Rare.

Gen. 91. Isthmoplea Kjellm.

I. sphærophora Kjellm. (= *Ectocarpus sphærophorus* Carm.). Coasts of Cornwall (Trevone, Mount's Bay, Land's End, Falmouth, Looe, Cawsand Bay); Devon (Wildersmouth, Ilfracombe, Bovisand, Plymouth, near Wembury, Torquay, Sidmouth); Dorset (Weymouth); Yorks. (Filey); Durham (Seaham Harbour, Ryhope, Hendon, Marsden); Northumberland (Cullercoats, Whitley, Hartley, Alnmouth, Berwick). Wales: Carnarvon (Menai Bridge); Anglesea (Puffin Island); Pembroke (Milford Haven). Scotland: Haddington (Dunbar, North Berwick); Edinburgh (Joppa, Caroline Park); Fife (Aberdour, Kinghorn, Earlsferry, Elie, Pittenweem); Forfar (Arbroath); Kincardine (Girdleness, Bay of Nigg); Aberdeen (Peterhead); Moray Firth; Orkney Islands; Argyle (Appin); Bute (Isles of Arran and Cumbrae); Ayr (Portincross). Ireland: Bantry Bay, Co. Cork. Not common.

Gen. 92. Myriotrichia Harv.

M. clavæformis Harv. Coasts of Cornwall (Mount's Bay, Falmouth, Looe); Devon (Plymouth, Paignton, Torbay, Sidmouth); Dorset (Swanage); Yorks. (Scarborough); Northumberland (Alnmouth, Holy Island, Berwick); Isle of Man; Cheshire (Hilbre Island). Wales: Anglesea (Llangwyfan). Scotland: Berwicks. (Burnmouth); Haddington (Dunbar, North Berwick); Edinburgh (Caroline Park); Fife (Kinghorn, Earlsferry, Elie, Pittenweem, Kilrenny); Forfar (Arbroath); Kincardine (Girdleness); Orkney Islands (Papa Westra); Bute (Isles of Arran and Cumbrae); Ayr (Ballantrae). Ireland: Bantry Bay and Cable Island, near Youghal, Co. Cork; Howth and Balbriggan, Co. Dublin; Belfast and North of Ireland generally. Channel Islands (Jersey). Not uncommon.—Var. *minima* Holm. et Batt. in Holm. Fasc. no. 167. Coasts of Devon (Torquay) and Dorset (Swanage). Rare.

M. filiformis Harv. Coasts of Cornwall (St. Minver, Mount's Bay, Falmouth, Looe); Devon (Plymouth, Torbay); Norfolk (Cromer); Yorks. (Filey, Scarborough); Northumberland (Cullercoats, St. Mary's Island, Alnmouth, Holy Island, Berwick); Cheshire (Hilbre Island). Wales: Anglesea (Llangwyfan). Scotland: Berwicks. (Burnmouth); Haddington (Dunbar); Fife (Kinghorn, Earlsferry, Elie, Pittenweem, &c.); Forfar (Arbroath): Kincardine

(Bay of Nigg); Aberdeen (Peterhead); Orkney Islands; Argyle (Oban); Bute (Isles of Arran, Cumbrae, and Bute). Ireland (Youghal, Co. Cork; Kilkee, Co. Clare, &c.). Channel Islands (Jersey, Guernsey, Alderney). Not uncommon.

M. densa Batt. Coasts of Cornwall (Scilly Islands) and Dorset (Weymouth, Swanage). Scotland: Bute (Isles of Arran and Cumbrae). Rare.

M. repens Hauck. (= *Dichosporangium repens* Hauck). Coasts of Cornwall (Falmouth); Devon (Wembury); Dorset (Swanage). Scotland: Elgin (Lossiemouth). Rare.

Fam. Arthrocladiaceæ Thur.

Gen. 93. Arthrocladia Duby.

A. villosa Duby. Coasts of Somerset (Minehead); Cornwall (St. Minver, Mount's Bay, Gerrans Bay, Torpoint); Devon (Plymouth, Torquay, Exmouth, Ladran Bay, Sidmouth); Dorset (Weymouth, Swanage, Studland); Hants (Isle of Wight); Sussex (Brighton, Hastings); Suffolk (Corton); Norfolk (Yarmouth, Cromer). Wales: Anglesea; Carnarvon (Bangor); Glamorgan (Swansea, Mumbles). Scotland: Haddington (Prestonpans); Orkney Islands (Kirkwall); Argyle (Ardthur, Appin); Bute (Isles of Arran and Cumbrae). Ireland: Wicklow; Malahide, Co. Dublin; Carrickfergus, Co. Antrim. Channel Islands (Jersey). Rather rare generally, but abundant in a few localities.

Fam. Elachistaceæ Rke.

Gen. 94. Myriactis Kütz.

M. pulvinata Kütz. (= *Elachistea attenuata* Harv. Phyc. Br. pl. 28A). Coasts of Cornwall (St. Minver, Trevone, Penzance, Falmouth, Looe); Devon (Elberry Cove, Torquay, Plymouth, Sidmouth); Dorset (Weymouth, Swanage); Yorks. (Scarborough, on *Halidrys*). Scotland: Bute (Isle of Cumbrae, on *Halidrys*). Ireland: Bantry Bay, Co. Cork; Miltown Malbay, Co. Clare; and West Coast generally. Channel Islands (Jersey, Guernsey, Alderney). Not uncommon.

M. Areschougii Batt. (= *Elachista Areschougii* Crn.). Coasts of Northumberland (Berwick). Scotland: Haddington (Dunbar); Bute (Isle of Cumbrae). Ireland: Murlough Bay, Co. Antrim. Rare.

M. stellulata Batt. (*Elachista stellulata* Griff.). Coasts of Cornwall (Falmouth, St. Mawes); Devon (Torquay); Dorset (Weymouth, Swanage). Scotland: Bute (Isles of Arran and Cumbrae); Ayr (Portincross). Channel Islands (Jersey, Guernsey).

M. Haydeni Batt. (*Elachista Haydeni* Gatty, et *El. moniliformis* Foslie). Coasts of Yorks. (Filey); Northumberland (Berwick); Cheshire (Hilbre Island). Rare.

Gen. 95. Elachistea Duby.

E. stellaris Aresch. *a typica* (epiphytic on *Arthrocladia villosa*). Coasts of Devon (Torquay, Sidmouth); Dorset (Weymouth). Wales. —*β Chordæ* Aresch. (epiphytic on *Chorda filum*, *Asperococcus*

bullosus, *Cutleria multifida*, *Spermatochnus paradoxus*, *Mesogloia Griffithsiana*, &c.). Coasts of Dorset (Weymouth, Swanage); Hants (Isle of Wight). Scotland: Orkney Islands. Rare.

E. fucicola Fries. Coasts of Cornwall (St. Minver, Padstow, Mount's Bay, Falmouth, Fowey, Looe); Devon (Plymouth, Torquay, Sidmouth); Dorset (Weymouth, Swanage); Hants (Isle of Wight); Sussex (Brighton); Kent (Deal); Essex (Clacton, Maldon); Norfolk (Cromer); Yorks. (Scarborough); Durham (Sunderland); Northumberland (Alnmouth, Berwick); Isle of Man. Wales: Anglesea (Puffin Island); Carnarvon (Bangor). Scotland: Berwicks. (Burnmouth); Haddington (Dunbar); Edinburgh (Joppa); Fife (Earlsferry, Elie); Forfar (Arbroath); Kincardine (Stonehaven); Aberdeen; Moray Firth; Orkney Islands; Argyle (Oban, Appin); Dumbarton (Gare Loch); Renfrew (Wemyss Bay); Bute (Isles of Arran and Cumbrae); Ayr (Ayrheads). Ireland generally. Channel Islands (Jersey, Guernsey, Alderney). Common and abundant everywhere on the coasts of the British Islands.

E. Grevillei Arnott. Coasts of Northumberland (Berwick). Scotland: Haddington (Dunbar); Bute (Isles of Arran and Cumbrae); Ayr (Largs, Seamill).

E. flaccida Aresch. (incl. *E. curta* Aresch.). Coasts of Cornwall (Trevone Bay, St. Minver, Mount's Bay, Looe); Devon (Plymouth, Torquay, Sidmouth); Dorset (Weymouth); Northumberland (Berwick, growing on *Halidrys*). Wales: Anglesea (Penmon Point); Glamorgan (Swansea). Scotland: Haddington (Dunbar); Fife (Earlsferry, Elie). Ireland generally. Channel Islands (Jersey, Guernsey, Alderney). **Not uncommon.**

E. scutulata Duby. Coasts of Cornwall (Mount's Bay, Falmouth, Fowey, Looe); Devon (Plymouth, Torquay, &c.); Dorset (Durlston Head, Swanage); Sussex (Shoreham, Brighton); Kent (Deal); Norfolk (Cromer); Yorks. (Scarborough); Northumberland (Newbiggen, Berwick, Holy Island); Isle of Man. Wales: Anglesea (Towyn-y-Capel). Scotland: Berwicks. (Burnmouth); Haddington (Dunbar); Fife (Elie, Pittenweem); Orkney Islands. Ireland generally. Channel Islands (Jersey, Guernsey, Alderney). **Not uncommon.**

Gen. 96. Leptonema Reinke.

L. fasciculatum Rke. Var. *subcylindrica* Rosenv. Coasts of Carnarvon (Bangor) and Southern Scotland; Bute (Isle of Cumbrae). **Very rare.** — Var. *uncinatum* Rke. Coast of Renfrew (Gourock). **Very rare.**

Gen. 97. Halothrix Rke.

H. lumbricalis Rke. Coasts of Dorset (Weymouth) and Southern Scotland: Bute (Isle of Cumbrae); Ayr (Fairlie). Rare.

Gen. 98. Giraudia Derb. et Sol.

G. sphacelarioides Derb. et Sol. Coast of Dorset (Weymouth, Swanage, Studland) and Hants (Shanklin, I.W.). Ireland (Roundstone Bay, Co. Galway). **Rare.**

Fam. Sphacelariaceæ J. Ag.

α *Sphacelariaceæ crustaceæ.*

Gen. 99. Battersia Rke.

B. mirabilis Rke. Coast of Northumberland (Spittal, Berwick). **Very rare.**

β *Sphacelariaceæ genuinæ.*

Gen. 100. Sphacella Rke.

S. subtilissima Rke. Coast of Devon (Plymouth). Very rare.

Gen. 101. Sphacelaria Lyngb.

S. radicans Harv. Coasts of Cornwall (St. Michael's Mount, Sennen Cove, Par, Pridmouth); Devon (Watermouth, Ilfracombe, Torbay); Dorset (Swanage); Sussex (Brighton); Durham (Seaton Carew, Ryhope, &c.); Northumberland (Alnmouth, Holy Island, Berwick); Cheshire (New Brighton, Hilbre Island); Isle of Man. Wales: Anglesea (Puffin Island); Carnarvon (Bangor). Scotland: Berwicks. (Burnmouth); Haddington (Dunbar); Edinburgh (Joppa, Leith); Fife (Kinghorn, Earlsferry, Elie, Pittenweem, Kilrenny); Forfar (Arbroath); Kincardine (Stonehaven, Girdleness); Orkney Islands; Argyle (Appin); Bute (Arran, Cumbrae). Ireland (Bantry Bay, Co. Cork; Dunmore, Co. Waterford). Channel Islands (Jersey, Guernsey, Alderney). Not uncommon.

S. olivacea Pringsh. Coasts of Cornwall (Par, Pridmouth); Devon (Ladran Bay, Sidmouth); Northumberland (Holy Island, Berwick). Scotland: Berwicks. (Burnmouth); Haddington (Dunbar); Edinburgh (Joppa); Fife (Elie); Forfar (Arbroath); Orkney Islands (Papa Westra); Bute (Isles of Arran and Cumbrae). Ireland (Dunmore, Co. Waterford). Channel Islands (Guernsey, Alderney). **Rather rare.**

S. racemosa Grev. Coasts of Northumberland (Berwick); Edinburgh (Caroline Park); Bute (Arran and Cumbrae). Very rare.

S. tribuloides Menegh. Southern shores of Scotland: Haddington (Dunbar). **Very rare.**

S. furcigera Kütz. *β saxatilis* Kck. Coast of Dorset (Swanage). **Very rare.**

S. cirrhosa Ag. *α pennata* Hauck. Coasts of Cornwall (St. Minver, Trevone, Mount's Bay, Falmouth, Looe); Devon (Plymouth, Torbay, Dawlish, Sidmouth); Dorset (Weymouth, Swanage, Studland); Hants (Isle of Wight); Sussex (Bognor, Worthing, Brighton); Kent (Dover, Deal); Norfolk (Yarmouth, Cromer); Yorks. (Scarborough); Durham (Marsden, Whitburn, Sunderland); Northumberland (Alnmouth, Holy Island, Berwick); Cheshire (Eastham, Hilbre Island); Isle of Man. Wales (Isle of Anglesea, Puffin Island); Carnarvon (Swillies). Scotland: Berwicks. (Burnmouth); Haddington (Dunbar, North Berwick); Edinburgh (Joppa, Caroline Park); Fife (Earlsferry, Elie, Pittenweem); Forfar (Arbroath); Kincardine (Stonehaven, Girdleness); Aberdeen (Peterhead); Moray Firth; Orkney Islands; Argyle (Oban, Appin, Loch Goil); Bute (Isles of Arran and Cumbrae); Ayr (Saltcoats, Ardrossan, Fairlie, Girvan). Ireland generally. Channel Islands

(Jersey, Guernsey, Alderney). Common and abundant.—*β irregularis* Hauck. Coasts of Dorset (Weymouth, Swanage) and Hants (Isle of Wight). Rather rare.—*γ patentissima* Grev. Coasts of Dorset (Weymouth), Sussex (Bognor), and Bute. Rather rare.—*δ fusca* Holm. et Batt. (= *S. fusca* Harv.). Coasts of Cornwall (Padstow, Pentire, St. Minver, St. Michael's Mount); Devon (Ilfracombe, Paignton, Torquay, Sidmouth); Norfolk (Cley); Durham (Seaham Harbour). Wales: Anglesea (Worms Head); Glamorganshire (Newton Nottage). Rather rare.—*ε agagropila* Griff. Coasts of Devon (Torquay, Sidmouth); Northumberland (Holy Island); Hants (Isle of Wight). Scotland: Bute (Isle of Cumbrae); Ayr (Fairlie, Heads of Ayr). West Coast of Ireland. Not uncommon. —*ζ nana* Griff. Devon (Torquay); Hants (Isle of Wight); Sussex (Bognor). Rather rare.

S. cæspitula Lyngb. Coasts of Northumberland (Berwick) and Carnarvon (Bangor). Very rare.

S. plumula Zan. (= *S. pseudoplumosa* Holm. Fasc. no. 24). Coasts of Cornwall (Gyllingvase Beach and Harbour, Falmouth, Pridmouth); Dorset (Weymouth, Smallmouth); Sussex (Brighton). Scotland: Lamlash Bay, Isle of Arran.

S. plumigera Holmes (*S. plumosa* Harv. Phyc. Br. pl. 87 pro parte). Coasts of Devon (Ilfracombe); Hants (Isle of Wight); Sussex (Brighton, Beachy Head, Eastbourne); Kent (Folkestone, Herne Bay); Essex (Harwich, Dovercourt); Suffolk (Felixstowe); Durham (Ryhope, Sunderland, Roker, Marsden); Northumberland (Cullercoats); Lancs. (Addingham, Walney Island). Wales: Carnarvon (Menai Straits, Bangor). Scotland: Haddington (Longniddry); Edinburgh (Joppa, Caroline Park); Fife (Elie, St. Andrews); Orkney Islands; Bute (Isles of Arran and Cumbrae); Ayr (Portincross, Ardrossan). Rather rare generally, but locally abundant. Ireland (Balbriggan and Howth, Co. Dublin).

Gen. 102. Chætopteris Kütz.

Ch. plumosa Kütz. (= *Sphacelaria plumosa* Harv. pro parte. *Cladostephus plumosus* Holmes). Coasts of Northumberland (Alnmouth, Berwick); Cheshire (Hilbre Island); Isle of Man. Wales: Anglesea (Puffin Island). Scotland: Haddington (Dunbar); Edinburgh (Joppa); Fife (Kinghorn, Earlsferry); Forfar (Arbroath); Kincardine (Stonehaven, Bay of Nigg); Aberdeen (Peterhead); Banff (Macduff); Orkney Islands (Kirkwall); Argyle (Firth of Lorne); Bute (Isle of Arran and Cumbrae); Ayr (Portincross, W. Kilbride, Ardrossan). Ireland (Wicklow, Portaferry, Co. Down). Rather rare.

Gen. 103. Cladostephus Ag.

C. spongiosus Ag. Coasts of Cornwall (St. Minver, Padstow, Mount's Bay, Falmouth); Devon (Plymouth, Torquay, Dawlish, Sidmouth); Hants (Isle of Wight); Sussex (Bognor, Worthing, Brighton); Kent (Deal, Ramsgate); Essex (Harwich); Suffolk (Felixstowe); Norfolk (Yarmouth, Cromer); Northumberland (Alnmouth, Holy Island, Berwick); Cheshire (Hilbre Island); Isle of Man. Wales: Anglesea (Puffin Island); Carnarvon (Menai

Straits). Scotland: Berwicks. (Burnmouth); Haddington (Dunbar, Longniddry); Edinburgh (Joppa); Fife (Earlsferry, Elie, Pittenweem); Forfar (Arbroath); Kincardine (Stonehaven, Girdleness); Aberdeen (Peterhead); Moray Firth; Orkney Islands; Argyle (Oban, Loch Goil); Bute (Isles of Arran, Cumbrae, and Bute); Ayr (Ardrossan, Heads of Ayr). Irish coasts generally. Channel Islands (Jersey, Guernsey, Alderney). Common.

C. verticillatus Ag. Coasts of Cornwall (St. Minver, Padstow, Mount's Bay, Falmouth, Looe); Devon (Plymouth, Torquay, Sidmouth); Dorset (Weymouth, Swanage); Hants (Isle of Wight); Sussex (Bognor, Brighton); Essex (Walton); Suffolk (Felixstowe); Norfolk (Yarmouth, Cromer); Yorks. (Filey, Scarborough); Durham (Roker); Northumberland (Whitley, Holy Island); Isle of Man (Porthdinlleyn Bay). Wales: Anglesea (Llangwyfan, Puffin Island). Scotland: Fife (Elie); Forfar (Arbroath); Kincardine (Girdleness); Aberdeen (Peterhead); Orkney Islands; Bute (Isles of Arran and Cumbrae); Ayr (Girvan). Ireland (Roundstone, Co. Galway; Wicklow, &c.). Channel Islands (Jersey, Guernsey, Alderney). Not uncommon.

Gen. 104. Halopteris Kütz.

H. filicina Kütz. (= *Sphacelaria filicina* Ag.). Coasts of Cornwall (St. Minver, Trevone, Mount's Bay, Falmouth); Devon (Hele, Ilfracombe, Plymouth, Littleham Cove, Exmouth, Salcombe); Hants (Isle of Wight); Durham (Seaham Harbour (extinct?); Isle of Man. Wales: Anglesea (Holyhead). Scotland: Argyleshire (Island of Eilan Dubh). Ireland (Youghal and Kinsale Harbour, Co. Cork; Belfast Bay; Bangor, Co. Down). Channel Islands (Jersey, Guernsey). Rare.—*β sertularia* (Bonnem.) (= *H. filicina* Kütz. *β patens* Harv.). Coasts of Devon (Torbay); Dorset (Weymouth); Hants (Isle of Wight); Sussex (Bognor, Brighton). Ireland (Belfast Lough; Carrickfergus, Co. Antrim; Roundstone Bay, Co. Galway). Channel Islands (Jersey, Guernsey). Very rare.

Gen. 105. Stypocaulon Kütz.

S. scoparium Kütz. (= *Sphacelaria scoparia* Ag.) *α typica*. Coasts of Cornwall (St. Minver, Trevone, Scilly Islands, Mount's Bay, Falmouth, Looe); Devon (Plymouth, Torquay, Exmouth, Sidmouth); Dorset (Weymouth, Swanage); Hants (Isle of Wight); Sussex (Worthing, Brighton); Kent (Dover, Deal, Margate); Essex (Walton); Norfolk (Yarmouth, Cromer); Cheshire (Hilbre Island); Isle of Man. Wales: Anglesea (Puffin Island); Carnarvon (Menai Straits). Scotland: Fife (Elie, Chapelness, Earlsferry); Forfar (Arbroath); Bute (Isles of Arran, Cumbrae, and Bute); Ayrshire. Not uncommon on the coasts of Ireland. Channel Islands (Jersey, Guernsey, Alderney). Common on the southern shores of England; local and scarce on those of Scotland and Northern England.—*β scoparioides* Holm. & Batt. (= *Sphacelaria scoparioides* Ag.). Coasts of Dorset (Weymouth) and Sussex (Bognor, Worthing). Ireland: Roundstone Bay, Co. Galway. Rare.

THE

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BRYOLOGICAL NOTES.

By Ernest S. Salmon, F.L.S.

(Continued from p. 9.)

(Plate 440.)

To the distribution of *Anomodon Toccoæ* Sulliv. & Lesq., which I have given in a previous note (Journ. Bot. 1901, p. 360, and 1902, p. 1), the following addition is to be made. In the Kew Herbarium there is a moss labelled "*Papillaria torticuspis* Broth. nov. spec. Birmah. comm. L. Linden; received Dec. 1893." This name has not, so far as I can find, been published. The moss is typical *A. Toccoæ;* the specimens are fairly robust and sparingly flagelliferous, and agree exactly with Indian and Ceylon examples of the species. Dr. J. Cardot has informed me that *A. Toccoæ* has been found in a third locality in North America, *viz.* Louisiana, Forest of Baton Rouge, at the foot of trees (leg. Rev. A. B. Langlois, Sept. 1, 1886).

(25). The Genus Thiemea C. Müll.

In *Bot. Centralbl.* Bd. vii. 346 (1881), Müller founded the genus *Thiemea* for the reception of a moss which existed in Hampe's herbarium under the MS. name of *Funaria saxicola.* Müller's description of the genus is as follows: "*Thiemea* gen. nov. Tribus *Funariacearum*, habitus *Funariæ* minutæ, peristomium *Trichostomi*, dentibus usque ad membranam brevissimam fissis apice hamate aduncis longe inflexis." This is followed by a specific description of the single species *T. Hampeana*, after which Müller remarks: "Ich glaubte längere Zeit, vorstehende Art und Gattung mit der, von mir anfangs nur sehr unvollständig gekannten *Wilsoniella* zusammen bringen zu mussen; allein die Entdeckung einer zweiten (australischen) *Wilsoniella*, welche sich vollständig zeigt, sowie der in Blattbau und Fruchtform unverkennbare Funariaceen-Typus beseitigten bald alle Zweifel. Jedenfalls liegt in der neuen Gattung *Thiemea* eine sehr bemerkenswerthe Variation der Funarioideen vor uns, wie sie gar nicht zu ahnen war. Die Zähne des Mundbesatzes schlagen sich, trotz ihrer *Trichostomum*-Form, so auffallend hakenförmig abwärts, wie das kaum bei einem anderen Moos-Peristom wieder vorkommt. Unter den akrokarpischen Moosen erinnern nur einige *Fissidens*-Arten an diese Eigenthümlichkeit, so dass man auch das Peristom der *Thiemea* ein ungewandeltes *Fissidens*-Peristom nennen könnte. Uebrigens nimmt das ganze Moos die Tracht eines *Leptotrichum* mit Funariaceen-Frucht an."

In Müller's *Genera Muscorum Frondosorum*, p. 113, the following remarks occur in the description of the genus *Thiemea:* "Frucht . . . einer *Funaria* ähnlich, entleert unter der verhältnissmässig grossen Kapsel-Mündung zusammengeschnürt. . . . Bei völlig entwickeltem Funariaceen-Blattnetze ist sie gewissermassen eine Verbindung desselben mit einem *Trichostomum*- oder auch *Fissidens*-Peristom und in dieser Beziehung folglich ungemein interessant.

. . . Denkt man sich ein *Leptotrichum* mit dem Blattnetze einer Funariaceen und dem Mundbesatze eines *Trichostomum*, so hat man eine gute Vorstellung von dem seltenen Moose."

We may note here that in the specific description given in *Bot. Centralbl.* the inflorescence is by an error described as "monoica ?," while in the "Genera" it is described as "probably dioicous."

In order to obtain, if possible, some further knowledge on *Thiemea Hampeana*, I have examined the type material in Hampe's herbarium at the British Museum (South Kensington). These specimens are, apparently, the only ones existent, as Dr. Brotherus informs me that the plant is not represented in Müller's herbarium. The material in Hampe's herbarium is rather scanty, and unfortunately there appear to be no capsules with a perfect peristome. The specimens are labelled, in Kurz's handwriting, "3328 Yomah. 21/2/71," and "Muigyee valley (before going to village of Kambila ascent), 21/2/71." To this Hampe has added, "3328 *Trematodon decipiens* Mitten. *Funaria saxicola*. Peristom. simpl. exsertum connivens sanguineum dent. per paria approximat. profunde partitis subulatis teretibus glabris apice inflexis opacis." In a separate note Hampe has written: "*Funaria saxicola*. Parvula vix uncialis, caulis debilis erectus brevior inferne laxefoliatus, superne radiatofoliatus, fol. caulina minora, comalia carinata anguste oblongolanceolata elongata flaccida acuminata subintegerrima, nervo fusco percursa, cellulis laxis elongatis funarioideis conformibus pellucidis reticulata, seta semiuncialis gracilis erecta apice inclinata theca parva oblonga macrostoma inclinata, operculo parvo conico, peristomium duplex opacum dentibus exterioribus didymis exsertis cruribus subulatis, inter. ciliis subulatis coloratis. Birma, Yomah; at saxa. leg. S. Kurz. Inter Funarias minima et gracillima; vix alia nec commutanda." Concerning the same moss Müller has written, evidently in a note to Hampe: "*Mildea Hampeana* mihi. Zweite Species ist *M. decipiens*—*Trematodon decipiens* Mitt.—welche in Blatt- und Fruchtform bedeutend abweicht. Leider fand ich weder Operculum noch Calyptra. Entschieden Funariaceen." The word "*Mildea*" in the above note has been altered to *Thiemea* in Hampe's handwriting.

Amongst the specimens of *Thiemea* I noticed a capsule and seta, detached from any stem, which attracted attention for the following reason. The capsule, as seen under a lens, was strongly constricted below the mouth, and the points of the teeth of the peristome were abruptly turned inwards,—the whole reminding one strongly of the capsule of some minute species of *Fissidens* (see fig. 9). Recalling Müller's remarks that the above characteristics were possessed by the capsules of *Thiemea*, I at first thought that the loose capsule and seta might belong to this genus. Microscopical examination, however, showed that this capsule was undoubtedly a stray one belonging to some species of *Fissidens*, the peristome agreeing perfectly with that genus (see fig. 10). Further, it seemed clear from several capsules (attached to stems) of the *Thiemea*, which showed remains of the peristome, that the teeth of the peristome in a dry state were somewhat curled or twisted or loosely

connivent, with a habit in no way recalling a *Fissidens*-peristome; moreover, no capsules were found constricted below the mouth. I am inclined to think, therefore, that Müller, whilst correctly describing the *Trichostomum*-like nature of the peristome, was led astray in his description of the capsule and peristome in a dry state by the admixture of a loose *Fissidens* capsule.

Hampe, from one of his notes, appears to have considered his moss at one time as being identical with Mitten's *Trematodon decipiens;* whilst, in another note, where the moss described (under the name of *Funaria saxicola*) is evidently the *Thiemea Hampeana* of Müller, the peristome is spoken of as double. It seems clear, however, from examination of capsules with fragments of the peristome attached, that Müller is quite correct in his description of the peristome of *Thiemea* as being single, and consisting of teeth, each divided almost to the base into two very long crura. On examining the intimate structure of the peristome, however, it is seen that it conforms to the *aplolepideous* type (see fig. 4). (The base of the teeth, at the point where they spring from the basal membrane, is opaque and densely covered with minute papillæ; above the base the crura are closely and densely trabeculate.) This fact prohibits us from placing the present moss among the *Funariaceæ*. Further, I am of the opinion that *Thiemea* is not distinct as a genus, but should be sunk in *Wilsoniella*. We see by the note sent by Müller to Hampe that the former was at first of the opinion that *Trematodon decipiens* Mitt. constituted a second species of the genus *Thiemea* (at that time called by Müller, in MS., *Mildea*). Later, however, Müller considered that *Trematodon decipiens* was generically distinct, and founded for its reception (in *Bot. Centralbl.* vii. p. 345) the genus *Wilsoniella* ("Tribus *Bryacearum*, habitus *Orthodontii*, peristomium *Trichostomi*, dentibus usque basin fissis"). Now, *Thiemea Hampeana* agrees exactly in the structure of its peristome with the species of *Wilsoniella*, and in its general habit recalling that of *Leptotrichum;* the areolation, too, of *Thiemea Hampeana* differs from that found in the species of *Wilsoniella* only in being laxer, and in *W. pellucida* we find the same thickening of the wall of the bluntly projecting marginal cells towards the apex of the leaf as in *T. Hampeana*. In *T. Hampeana*, also, as in species of *Wilsoniella*, we find an indistinct neck, which gives to the capsule a *Trematodon*-like appearance. On the whole, considering the exact agreement of peristome structure, and the absence of any important points of difference, I consider that the present moss is to be placed in *Wilsoniella*, where it must bear the name W. Hampeana (C. Müll.).

As to the position of the genus *Wilsoniella*, it cannot clearly, on account of its aplolepideous type of peristome, be placed in the *Bryaceæ*, as Müller proposed, but clearly belongs either to *Dicranaceæ* or to *Tortulaceæ*. If to the former, then perhaps the genus is best placed near *Trematodon*, as Bescherelle has remarked (Ann. Sci. Nat. sér. vii. xx. 15 (1895)).

The following characters may be added to the specific description of *W. Hampeana*:—Planta 1·5 cent. alta, foliis 1·5–2 mill. longis,

capsula in pedunculo 10–12 mill. longo siccitate valde dextrorso 0·75–1 mill. longa. In the centre of the leaf-nerve, as seen in transverse section, there is a small group of 3–5 cells with slightly thickened walls; the same nerve-structure is found in *W. pellucida*, where, however, the group is composed of more numerous cells with a more thickened cell-wall (cfr. figs. 8, 15). The stem of both *W. Hampeana* and *W. pellucidens* is composed of one or two peripheral rows of cells with slightly thickened coloured cell-walls, enclosing a central mass of very delicate and very thin-walled cells. The basal membrane of the peristome is very reduced, but is still just visible, in *W. pellucida*; in *W. crispidens* it is, although still small, more evident; while in *W. Hampeana* it is well marked.

(26). Syrrhopodon Gardneri (Hook.) Schwaegr. var. Maclellandii (Griff.).

Dr. J. Cardot sent me lately a moss labelled "*Syrrhopodon Gardneri* Schw.?, Sikkim; Kurseong, leg. Rev. Decoly, 1899," and asked me to compare it with the type of *S. Gardneri*, adding, "Je remarque que sur mon specimen les feuilles sont plus étroites et plus allongées que sur la pl. xliii du *Bryologia Javanica*." On making the comparison, I found that Dr. Cardot's plant, although certainly the "*S. Gardneri*," in part, of Mitten's *Musc. Ind. Or.*, differed in certain peculiarities from Hooker's type of *S. Gardneri*, and in fact presented characters sufficiently well marked, it seemed to me, to entitle the plant to varietal rank. These characters are as follows: stem taller and more flexuous; leaves longer and narrower, with the margin more incrassate and more strongly doubly-toothed; the cells of the leaf are more indistinct and slightly more papillose on both surfaces; the nerve is much more strongly spinoso-dentate on the ventral surface. The shorter stems and broader leaves of *S. Gardneri* type are well seen in *Hook. Musc. Exot.* tab. cxlvi., and in *Bryol. Jav.* i. tab. xliii.

Now, there is in the Kew Herbarium a moss labelled, in Griffith's handwriting, "*Weissia Maclellandii*; Myrung Wood, on decayed wood." This is the type of *W. Maclellandii* Griff., *Notulæ*, ii. 408 (1849), and *Icon. Plant. Asiat.* ii. tab. lxxviii. f. 4 (1849). Mitten (*Musc. Ind. Or.* p. 40) has quoted *W. Maclellandii* Griff. as a synonym of *S. Gardneri*, remarking, "Specimina Griffithiana non vidi, sed neque in descriptione nec in icone distinctionem a *S. Gardneri* invenio."

In Griffith's plant, however, we find the narrower, longer leaves, with more incrassate and more toothed margins, the denser areolation, and the spinosely-dentate nerve characteristic of Dr. Cardot's plant. We may note, too, that in Griffith's diagnosis of his *W. Maclellandii* the spinosely-dentate ventral surface of the nerve is remarked upon as follows:—"Folia . . . percursa vena solida, dorso inferne scabrella superne serrulata." Further, Griffith remarks of his species, "A *Calympera Gardneri*, saltem quoad iconem Hook. Musc. Exot. t. 146 vix distinguenda, nisi carina foliorum serrulata et peristomio."

I propose, therefore, to use Griffith's name *Maclellandii*, treating

the plant as a variety of *S. Gardneri* (Hook.). There can, I think, be no doubt that the plant is not specifically distinct from *S. Gardneri*, since all the characters shown are comparative ones. It is interesting to find also, from a specimen in the Kew Herbarium and in Wilson's herbarium, that Wilson took the same view of the position of the plant. This specimen is labelled "*Calymp. Gardneri* Nepal," and bears a note affixed, in Wilson's handwriting, "var. foliis angustioribus, margine magis incrassatis, duplici serie serratis, setis longioribus." This specimen consists of three examples, of which the two upper agree with *S. Gardneri* var. *Maclellandii*, while the lower is typical *S. Gardneri*.

As regards the distribution of *S. Gardneri* and its variety in India, the specimens in the Kew and British Museum Herbaria are to be sorted as follows. The plant labelled "124 Herb. Ind. Or. Hook. fil. & Thomson. Hab. Nurtiung, Mont. Khasia, reg. temp. alt. 5,000 ped." belongs to var. *Maclellandii;* this specimen bears a ticket, in Wilson's handwriting, "124. *S. cognatus* Wils. ms." (see Wilson in Hook. Journ. Bot. ix. 292 (1857)). Mitten, in *Musc. Ind. Or.* p. 40, quotes, under "*S. Gardneri*," the specimens "In Ceylon. Gardner (no. 181, 187)." No. 187 Herb. Ind. Or. Hook. fil. & Thomson, bears the locality "Tambur fluv. Nipal orient. alt. 7,000," and is typical *S. Gardneri;* but no. 181 Herb. Ind. Or. Hook. fil. & Thomson, which is labelled "Ceylon. Coll. G. Gardner," is certainly not *S. Gardneri* type, and, I think, differs specifically from it in its more rigid habit, the very long narrowly linear lamina, and the nerve spinosely papillose beneath; the leaves, moreover, are scarcely curled in the dry state. This specimen (no. 181) bears the name "*S. fuscescens* Wils. ms." (in Hook. Journ. Bot. ix. 292 (1857)). A specimen in Griffith's herbarium at Kew, labelled "Tassangsee, Bhotan," belongs to *S. Gardneri* type.

The synonymy and distribution are as follows:—

Syrrhopodon Gardneri (Hook.) Schwaegr.

Calymperes Gardneri Hook. Musc. Exot. ii. tab. cxlvi. (1820).

Syrrhopodon Gardneri Schwaegr. Suppl. ii. i. 110, tab. cxxxi. (1823), et ii. ii. 100 (1827); Hook. & Grev. in Edinb. Journ. Sci. iii. 223 (1825); Müll. Syn. i. 538 (1849); Bryol. Jav. i. 54, tab. xliii. (1855–1861); Mitt. Musc. Ind. Or. 40 (partim) (1859).

Cleistostoma Gardneri Brid. Bry. Univ. i. 155 (1826).

Distrib.—India: Nepal (G. Gardner) (Dr. Buchanan), c. fr.!; Tambur fluv. Nipal orient. alt. 7000 ft. (Herb. Ind. Or. Hook. fil. & Thomson, no. 187), c. fr.!; Tassangsee, Bhotan (Herb. Griffith), c. fr.!; Birma, 3–4000 ft. (inter no. 2833) (S. Kurz)!

Var. Maclellandii (Griffith).

Weissia Maclellandii Griff. Notulæ ii. 408 (1849), et Icon. Plant. Asiat. ii. tab. lxxviii. f. 4 (1849).

Syrrhopodon cognatus Wils. MS. in Hook. Journ. of Bot. ix. 292 (1857).

S. Gardneri Mitt. Musc. Ind. Or. 40 (partim) (1859).

A typo differt: caule elatiore, flexuoso; foliis longioribus an-

gustioribus, margine magis incrassato et fortius duplicato-serrato, laminæ cellulis obscurioribus, nervo supra spinoso-dentato.

Distrib.—India: Nepal (Gardner), with the type, c. fr.!; Khasia, Myrung Wood, on decayed wood (D. McClelland), c. fr.!; Nurtiung, Mont. Khasia, reg. temp. alt. 5000 ped. (Herb. Ind. Or. Hook. fil. & Thomson, no. 124), c. fr.!; Sikkim, Kurseong (Rev. Decoly, 1899), c. fr.!

It may be noted here that authors have described differently the capsule of *S. Gardneri*. Hooker says, "capsula siccitate vix sulcata"; Schwaegrichen and Müller, "capsula lævissima"; Bridel, "theca lævis"; and the authors of Bry. Jav., "capsula longitudinaliter plicata." In the type specimens of *S. Gardneri* the capsules are distinctly longitudinally plicate, as shown in Bry. Jav. i. tab. xliii.; the plication, however, is not evident in the examples of *S. Gardneri* from the Tambur river (Herb. Ind. Or. Hook. fil. & Thomson, no. 187); and in the Tassangsee examples, while most of the capsules are plicate, one quite smooth old capsule occurs. On the other hand, in the var. *Maclellandii* the capsule is always, apparently, perfectly smooth and shining. All authors have described the calyptra of *S. Gardneri* as "lævis"; in reality, however, the apex of the calyptra is distinctly scabrous—a fact noted by Wilson on specimens in his herbarium.

(27). Pogonatum nudiusculum Mitt. Musc. Ind. Or. 153 (1859).

The following description of this species is drawn up from examination of the type specimen in the Kew Herbarium (Hab. Khasia, reg. sub-trop. alt. 4000 ped. Herb. Ind. Or. Hook. fil. & Thomson, no. 1249):—

Dioicum? olivaceo-viride; caule breviusculo subflexuoso erecto ad 2 cent. alto simplice vel rarissime dichotomo inferne nudo, foliis confertis siccitate incurvis tortilibus humidis patentibus e basi brevi integra, circ. 1 mill. lata suberecta lineari-lanceolatis acutis 3·5–5 mill. longis 0·5–0·75 mill. latis superne latitudinis tertiam partem ad dimidium vel rare tres partes lamellosis dorso apicem versus spinoso-dentatis, margine e medio vel infra ad apicem distantius serratis, lamellis humillimis in sectione transversali e 1–2 cellulis compositis cellula marginali ovali lævi, basis cellulis inferioribus subrectangularibus latitudine 3–5-plo longioribus, laminæ unistratosæ quadratis et rotundato-quadratis 10–14 μ latis, foliis perichætialibus caulinis superioribus conformibus, capsula in pedunculo elongato 3–4 cent. alto erecto plus minus flexuoso purpureo ovali-cylindrica 2·5–3·5 mill. longa 0·75–1 mill. lata erecta æquali vel subinæquali et subinclinata tereti os versus grosse papillosa siccitate sub ore constricta, dentibus 32, columella quadrialata, operculo conico breviter rostrato.

From *P. seminudum* Mitt. the present species is at once distinguished by the much smaller cells of the lamina (cfr. figs. 18, 21), which is moreover of quite a different texture in the two species. The lamellæ, which are always very low, being only 1–2 cells high, occupy usually from one-third to one-half the width of the lamina, so that on either side of the lamellæ there is usually a wide border

of naked lamina ; sometimes, however, the lamellæ are more numerous, covering three-quarters of the width of the lamina, and so leaving only a narrow border on either side.

Besides the specimen from the type locality mentioned above, there is a moss in the Kew Herbarium, from Griffith's herbarium, labelled in Mitten's handwriting *P. nudiusculum*, from "above Sanah, 8000 ft. alt. in woods." This was collected by Griffith in Bhotan (see Griffith, *Journals of Travel*, p. 245 (1847)). Griffith's plant, however, differs from *P. nudiusculum* in the wholly fuscous colour, taller stems, and erecto-patent longer narrower leaves with a linear lamina, and, moreover, is clearly either *P. fuscatum* Mitt. or a variety of that species. I have, however, received a specimen (now in the Kew Herbarium) of true *P. nudiusculum* Mitt. from Dr. J. Cardot, labelled "Sikkim; Darjeeling (leg. Moller, 1901)."

EXPLANATION OF PLATE 440.

Figs. 1–8.—*Thiemea Hampeana* C. Müll., drawn from the type specimen in Hampe's herbarium. 1. Plant, nat. size. 2. The same, × 7. 3. Two capsules, one with fragments of peristome, × 17. 4. Base of two peristome-teeth, seen from the interior (ventral) surface, showing aplolepideous type of structure, × 170. 5. Stem-leaf, × 17. 6. Apex of same, × 170. 7. Areolation in lower part of same, × 170. 8. Transverse section of nerve of leaf, × 270.

Figs. 9, 10.—Capsule and peristome-tooth of a species of *Fissidens*, found intermixed with the type specimens of *T. Hampeana*. 9, × 35; 10, × 100.

Figs. 11–16.—*Wilsoniella pellucida* (Wils.) C. Müll., drawn from a specimen in the Kew Herbarium. 11. Stem-leaf, × 17. 12. Apex of same, × 170. 13. Apex of another leaf, × 270. 14. Areolation of a stem-leaf, just below middle, × 170. 15. Transverse section of nerve of leaf, × 270. 16. Capsule, × 17.

Figs. 17–20.—*Pogonatum nudiusculum* Mitt., from type in Kew Herbarium. 17. Stem-leaf, × 17. 18. Areolation at margin of lamina of same, × 270. 19. Part of a transverse section of lamina, showing lamellæ, × 270. 20. Part of a lamella, seen from the side, × 270.

Fig. 21.—*P. seminudum* Mitt. Areolation at margin of the lamina of a stem-leaf, × 270.

BUCHANAN'S AVAN PLANTS.

By James Britten, F.L.S.

At the end of *An Account of an Embassy to the Kingdom of Ava* in 1795, by Major Michael Symes (London, 1800), are eight plates with descriptions of plants (pp. 473–479), to which the following note is prefixed:—"The Plants, of which the following descriptions and figures are given, have been selected by the President of the Royal Society, as the most rare and curious among a copious and valuable collection made by Doctor Buchanan, who transmitted to the Court of Directors an hortus siccus in excellent preservation, together with delineations of each plant, executed on the spot." Buchanan (afterwards Hamilton), who had been appointed surgeon to the East India Company in 1794, accompanied the Embassy "in a medical capacity"; the plants referred to above are (with one exception) now in the Department of Botany of the British Museum, together with a folio MS. in which are descriptions, and a volume

containing fifty-three large coloured drawings, from which the eight plates were chosen for reproduction. In his preface Syme stated that "Sir Joseph Banks selected and described the plants": the MS. referred to is evidently that from which the published descriptions were taken, and these were prepared by Dryander, whose corrections appear in the MS., and who is the author of the sentence signed "Edit." in the published description of *Heritiera Fomes*. The attribution of the descriptions to Banks is inaccurate, as there is no indication in the MS. or in the Herbarium that he had any direct share in the work. The MS. is not in Buchanan's hand: it is prefaced by an introduction in English in another hand (not Buchanan's), which is followed by a Latin translation in the hand of the writer of the descriptions. The introduction, which is clearly by Buchanan, and is dated "Luckipore, August, 1796," runs as follows:—

"In this catalogue are the names of such plants as I met with in my journey to the King of the Barmans, to whose court I was lately sent. I have added descriptions of such as are least known, and also some notes of observation. To the names of the Plants I have subjoined the places where they grow, and the months in which they are in flower. As often as I have been able, I have noticed the Burman name; but in this I have probably been frequently mistaken, as the name given me may have been generic or perhaps trivial. After my return to Calcutta, I shewed the drawings and dried plants to a native who had returned with me from the Burman country, and he has written down the names of such as were known to him. Before I conclude, I must acknowledge my obligations to my friend Roxburgh, who with a liberality inspired by the true regard for science, has communicated to me his own drawings and descriptions of plants, and diligently compared with them such plants I brought with me: and I cannot but admire his infinitely superior knowledge of the plants of India. Such plants as are marked with an asterisk have been described by Dr. Roxburgh and drawn under his inspection."

The enumeration of the title, which runs: "Enumeratio Plantarum quas adeundo civitatem Barmanorum regiam et dehinc redeundo Anno MDCCXCV observavit Franciscus Buchanan," occupies 168 folio pages and contains 543 names; a large number of the plants are described at length, many of them as new; and references are made to the plates in the accompanying volume of drawings, which bear, in Buchanan's hand, names corresponding with the descriptions. Nearly all are included in the Banksian herbarium; these are indicated by a 'tick' in the margin, added when the specimens were incorporated in the herbarium. One of the drawings—*Tectona Hamiltoniana*—is reproduced by Wallich (*Pl. Asiat. Rar.* iii. t. 294) with Hamilton's description from his MS.; and in the same work (i. p. 70) Wallich says of *Melhania Hamiltoniana* that "a specimen and drawing of it are preserved in the late Dr. Hamilton's collection of Burmese plants at the British Museum."

It may be well to give a list of the plants figured in Symes's book with the names now adopted, where these differ; I have added

the page to each, as in *Index Kewensis* and elsewhere they are often cited from the second edition of the work. I have also added, for convenience of reference, the number of the corresponding figure in the collection of drawings. With the exception of the first species, all the plants are here first described:—

Thalia cannæformis Forst. (p. 473; pl. 2) = Clinogyne dichotoma Salisb.
Gardenia coronaria (p. 474; pl. 8).
Pontederia dilatata (p. 475; pl. 52) = Monochoria hastæfolia Presl.
Bauhinia diphylla (p. 476; pl. 13).
Sonneratia apetala (p. 477; pl. 20).
Epidendrum moschatum (p. 478; pl. 34) = Dendrobium moschatum Sw.
Agyneja coccinea (p. 479; pl. 43) = Phyllanthus coccineus M. Arg.
Heritiera Fomes (p. 480; pl. 44).

The name *Dendrobium Calceolaria*, adopted in Fl. Brit. Ind. v. 744 for Buchanan's plant and in *Index Kewensis* for *D. moschatum* Wall., must give place to *D. moschatum* Sw., which Mr. Jackson retains as a separate species and which is not cited in Fl. Brit. Ind. Swartz's description is based on Buchanan's plant, of which his knowledge seems to be entirely derived from the description in Symes's book. It would appear, however, that Wallich gave the same specific name, thinking the plant to be new; at any rate, there is no reference to Buchanan's plant in his original description. The nomenclature stands:

DENDROBIUM MOSCHATUM Sw. in Schrader Neues Journal für die Botanik, i. 94 (1805); Wall. in D. Don Fl. Nepal. 34 (1825); Index Kewensis, 730.
D. Calceolaria Hook.* Exot. Fl. iii. t. 184 (1827); Hook. f. Fl. Brit. Ind. v. 744; Index Kewensis, 728.

Buchanan's drawing has dark orange flowers resembling those of *D. moschatum cupreum* (Williams' *Orchid Album*, t. 165); it would appear that Hooker was right in considering this and *D. Calceolaria* as forms of the same species (see Bot. Mag. t. 3837).

As *Heritiera Fomes*† was first published in Symes's book, it may be well to note that in Buchanan's MS. it was at first considered identical with *H. littoralis*, and this name appears in the Herbarium and on the drawing of the fruit. The differentiation was due to Dryander, who adds to the synonym *H. littoralis* quoted in the MS., "diversa species."

It would probably be worth the while of some botanist well acquainted with Indian plants to go through this collection—the earliest made by Buchanan—with a view to the identification of the species, as it is likely that the geographical range of some would

* The name is cited as of "Carey's MSS.," but it is stated subsequently that Carey called it *Cymbidium moschatum*.

† "Lignum fomes optimus."

be thereby considerably extended. There is, for instance, a specimen which Reichenbach named doubtfully *Dendrobium ciliatum*—a species published by Parish in Bot. Mag. t. 5430 (1864)—which Dr. Rendle (with the help of Buchanan's drawing, which Reichenbach did not see) considers to belong to this species.

NEW CRASSULAS FROM SOUTH AFRICA.

By S. Schönland, M.A., and Edmund G. Baker, F.L.S.

The following species of *Crassula* appear to us to be hitherto undescribed. We have included with the description of these novelties descriptions of *Dinacria sebæoides* Schönland, and *Crassula deltoidea* Thunb., and a note on the flowers of *C. divaricata* Eckl. & Zeyh., which at the time of the publication of the *Crassulaceæ* by Harvey in the *Flora Capensis* were unknown.

Dinacria sebæoides Schönland in Bull. Herb. Boiss. 1897, p. 860 (nomen). Annua glabra 6–8 cm. alta, habitu *Sebææ crassulæfoliæ*. Caulis filiformis superne interdum levissime alatus. Folia caulinia sessilia oblonga vel oblongo-lanceolata, apice obtusa, 7–10 mm. longa, 3–4 mm. lata. Flores in dichasio laxo 12–24-fl. dispositi, quam ei *D. filiformis* Harv. multo majores, bracteis foliis similibus sed minoribus, pedicellis filiformibus 4–10 mm. longis. Calyx 4 mm. longus, calycis lobi oblongo-ovati vel ovati obtusi ± 2 mm. longi. Petala oblongo-oblanceolata, apice obtusa, basi sublibera, ± 8 mm. longa, lutea. Carpella gracilia, dorso papillifera quam corolla multo breviora, stylis apice bilobatis, stigmatis infra apicem stylorum semiglobosis dorsalibus, squamis spathulatis.

Hab. Beaconsfield, near Grahamstown, *Dr. S. Schönland*, no. 414. Sept. 1891.

This peculiar species has, as far as we know, only been found (by S. S.) in one spot, about five miles north of Grahamstown. In habit it resembles some forms of *Sebæa crassulæfolia*, which is very common near Grahamstown, and for this reason *D. sebæoides* may have been overlooked by other collectors, nor is it identical with any of the many forms of *Grammanthes gentianoides*, the originals of which we have examined, and to some of which it also bears some resemblance. A little glabrous annual of the genus *Dinacria*, but not much resembling *Crassula capillacea* E. Meyer (*D. filiformis* Harvey). Calyx-lobes oblong-ovate, obtuse, much shorter than the petals. Petals yellow, oblanceolate, obtuse, ± 8 mm. long. The two-lobed apex of the style is very peculiar, and each carpel has the short dorsal horn below the summit which bears the stigmatic surface. Another species of this genus is *D. grammanthoides* Schönland in Bull. Herb. Boiss. 1897, p. 859.

Crassula divaricata Ecklon & Zeyher, Enum. p. 296 (1835). Calyx-lobes lanceolate or ovate-lanceolate, glabrous on the back; shortly ciliate on the margin, hardly 2 mm. long. Petals oblong,

acute, glabrous, longer than the sepals, ± 3 mm. long, ± 1 mm. broad, keeled. Squamæ quadrate, yellowish. Anthers violet-coloured, filaments narrow at the apex, broadening downwards. Carpels slightly shorter than the stamens.

Hab. Namaqualand, Steinkopf, *Max Schlechter*, no. 42. In flower, 11 Dec. 1897.

The above has been compared with type.

C. rudis, sp. nov. Herbacea glaberrima perennis, e basi ramosa, c. 15 cm. alta. Folia 6–8 paribus conferta subimbricata connata ± 1 cm. longa crassa carnosa acuminata ovato-lanceolata, transverse fere circularia, ± 3 mm. diam. Flores pauci terminales cymoso-corymbosi, bracteis parvis lanceolatis oppositis. Pedunculus c. 7 cm. longus. Calycis lobi breves ovati c. ·5 mm. longi, dorso rotundati. Petala alba venis roseis erecta, ad apicem recurvata, ad basin connata, c. 1·5 mm. longa, ovata vel ovato-lanceolata acuta. Filamenta crassa sursum leviter attenuata, antheris ovatis. Stamina carpellaque vix 1 mm. longa, stylis breviter subulatis. Squamæ late cuneatæ, apice leviter emarginatæ latiores quam longæ.

Hab. Namaqualand, Garies, *Mr. E. G. Alston.* Oct. 1897. Flowered in Grahamstown, Dec. 1898.

This plant has the appearance of small specimens of *C. acutifolia* Lam., but is quite different. Leaves 6–8 or fewer pairs, closely set, patent or erecto-patent, subimbricate, ovato-lanceolate, connate, about 1 cm. long, almost circular in transverse section, about 3 mm. greatest diameter. Inflorescence terminal cymoso-corymbose, with comparatively few flowers and tooth-like bracts. Calyx-lobes short, ovate, rounded on the back, much shorter than the petals. Petals whitish with rosy veins, only recurved at the apex, and therefore flower campanulate, ovate or ovate-lanceolate acute. Filaments thick, tapering above. Anthers ovate, dark brown. Squamæ broadly cuneate or almost rectangular, slightly emarginate at apex.

Closely allied to *C. densifolia* Harv. from which it differs by its campanulate smaller flowers and differently shaped leaves.

C. Ernesti, sp. nov. Fruticulus parvus. Caulis ad basin lignosus superne herbaceus ramosus, rami erecti vel adscendentes plerumque albo-hirti 4–6 cm. longi, internodiis 3–5 mm. longis. Folia opposita cinerea hirta carnosa ovata vel oblongo-ovata erecto-patentia, apice acuta vel subacuta sessilia, 6-7 mm. longa, 3–4 mm. lata, internodiis longiora. Flores in cymos terminales dispositi. Cymæ paucifloræ compactæ, pedicellis cinereo-hirtis. Calycis lobi lanceolati, basi connati, patentim cinereo-hirti, ± 2 mm. longi. Petala oblonga vel oblongo-lanceolata breviter mucronata aliquantulum concava, sepala fere æquilongia. Squamæ minutæ vix 1 mm. longæ emarginatæ. Carpella apicem versus gradatim attenuata.

Hab. Among rocks, mountain top, Bowker's Park, Queenstown, alt. 4800 ft., *E. E. Galpin*, no. 2563. In flower 22 Jan. 1899.

A small branching weak-stemmed plant. Stem woody below, herbaceous above, 4–6–7 cm. long, except at base generally hairy. Leaves opposite, hairy, ovate or oblong-ovate, sessile, fleshy, acute

or subacute, 6–7 mm. long, 3–4 mm. broad at broadest point. Internodes 3–5 mm. long—the leaves are therefore longer than the internodes. Cymes terminal, corymbose, few-flowered. Sepals lanceolate, hairy, ± 2 mm. long. Petals, in specimens examined, about the same length as the sepals, oblong or oblong-lanceolate, glabrous, somewhat concave, with a short mucro just behind the apex. Anthers somewhat violet-coloured, stamens distinctly shorter than the petals. Squamæ minute emarginate, under 1 mm. in length. Perhaps allied to *C. Dregeana*, but quite distinct, differing in shorter petals, shorter internodes, &c.

Named in honour of the collector, *Mr. Ernest E. Galpin*.

C. mesembrianthoides, sp. nov. Species ad *C. exilem* Harvey et *C. deltoideam* Thunb., affinis. Perennans, radice crasso valido ramoso. Rami breves crassi. Folia nunc fere globularia, nunc oblongo-globularia, semper carnosa et crassa, superne plus minusve applanata, suprema interdum mucronulata, 1·0–2·0 cm. longa. Pedunculus terminalis tenuis, c. 6–8 cm. longus, inferne glaber superne tenuiter papillatus, bracteis oppositis ad basin connatis, dorso tenuiter hirtis 3–5 mm. longis. Calyx quam corolla brevior, calycis lobi crassi, dorso carinati tenuiter papillati. Corolla apicem versus constricta, petala alba anguste ovata. Stamina squamæque ut in congeneribus.

Hab. Hondeklip Bay, *E. G. Alston*, June, 1897.

Perennial branched from the crown with a thick caudex in wild specimens. Branches terete, rotund, short. Leaves of various shapes, always very thick, fleshy, always more or less flattened above. Upper leaves sometimes ciliate at junction of two opposite ones, otherwise stem-leaves glabrous. Upper portion of peduncle covered with minute greyish papillæ. Calyx more than two-thirds length of the corolla. Corolla constricted near the apex, opening very narrow. Stamens, pistil, squamæ as in allied species.

This plant was cultivated at Grahamstown, and nobody at first sight would take the cultivated plant to be the same as that received from Mr. Alston from Hondeklip Bay. The peduncle in cultivated specimens is more elongated, the leaves not so close, and altogether the plant, being not so stout, bears a very different aspect.

C. DELTOIDEA Thunb. Perennis, e basi ramosa, ad 12 cm. alt. Caulis crassus adscendens densissime foliatus, columnam quadrangularem formans. Folia crassissima carnosa perfoliata fere semiorbicularia, superne leviter convexa, dorso convexa glauco-pulverulentia, superne subcarinata, margine ciliata. Pedunculus terminalis c. 8 cm. longus breviter papillatus, bracteæ breves ad basin carnosæ, ad basin connatæ oppositæ, foliis subsimiles sed multoties minores. Calyx quam corolla duplo brevior, c. 2 mm. longus, calycis lobi leviter dorso rotundati tenuiter papillati. Petala alba mucronulata paullo recurvata lanceolata. Squamæ oblongo-cuneatæ, apice leviter emarginatæ.

Hab. Namaqualand, *Mr. E. G. Alston*.

The above description was drawn up from a plant which flowered in Grahamstown. We have not seen Thunberg's type of

this species, but it agrees with the description in the Nova Acta Nat. Cur. vi. p. 334 in all its leading characteristics. Ecklon & Zeyher's specimens, quoted in *Flora Capensis*, seem to be correctly referred to this species. Thunberg's plant was from "in Carroo prope Olyfants rivier, Hantum."

When dried looks somewhat like *C. cornea*, but the two are quite distinct. Stem thick, ascending, densely covered with thick fleshy imbricating leaves, which form a quadrangular column. The portion of the leaves exposed to view is glaucous pulverulent. Diameter of column formed by leaves about 2·2 cm. Peduncle terminal, about 8 cm. long, closely covered with very short greyish papillæ, and with a couple of pairs of bracts subsimilar to the leaves, but much smaller. Petals white, mucronulate, slightly recurved.

C. deceptor, sp. nov. Perennis, e basi ramosa, habitu et ambitu foliorum *C. deltoideæ* Thunberg, a qua differt caulibus brevioribus, foliis dorso tessellatis, etc. Caules breves crassi, foliis imbricantibus tecti. Folia carnosa quam ea *C. deltoideæ* firmiora, dorso et superne ad apicem tessellata. Flores in cymam subcorymbosim dispositi. Pedunculus sæpissime terminalis, 2–3–4 cm. longus, dense griseo-papillosus, 2–4–6 bracteis sterilibus parvis munitus. Calyx ± $\frac{2}{3}$-plo quam corolla brevior, 1·5 mm. longus; calycis lobi oblongo-ovati, extrinsecus griseo-papillosi, dorso leviter rotundati, circa 1 mm. longi, apice obtusi. Petala leviter recurvata oblongo-ovata, ± 2 mm. longa. Stamina carpellis subæquilonga, quam petala breviora, filamentis gracilibus. Carpella ± 1·3 mm. longa. Squamæ vix ·5 mm. longæ.

Hab. Namaqualand, 1897, *Mr. E. G. Alston.*

Perennial. Growth, shape of leaf-covered stem, and shape of leaves very much the same as in *C. deltoidea* Thunb., but somewhat more thickset and shorter. Leaves firmer in texture than in *C. deltoidea*, and tessellate on the back and upper portion of the inside, each little field leaving a green centre surrounded by more or less pentagonal glaucous lines. Sepals gently rounded on the back, not so thick as in *C. mesembrianthoides.* Petals a dirty cream white, slightly recurved, but leaving only a very narrow opening, Whole flower nearly globular. Carpels about 1·3 mm. long, somewhat narrowed above, stigma sessile.

This is one of the plants which have been taken for *C. deltoidea* Thunb., but it appears to be very distinct.

C. cornuta, sp. nov. Perennis e basi ramosa, habitu *C. deltoideæ.* Caulis brevis crassus, foliis imbricantibus tectus. Folia crassa glauca minute papillosa subperfoliata quadrifaria ovata, dorso concava subcarinata, intus apice subplana, basi excavata 5–14 mm. longa inferiora emarcida. Flores in cymam paniculatim dispositi. Pedunculus gracilis 4–6 cm. altus, 2–4 bracteis sterilibus parvis munitus. Calyx ± 2·0 mm. longus, margine ciliatus, calycis lobi oblongo-ovati obtusi, quam corolla subduplo breviores. Petala alba nec recurvata ovato-oblonga, dorso carinata concava, ± 2 mm. longa.

Carpella staminaque quam petala breviora, stigmatibus sessilibus. Squamæ vix ·5 mm. longæ, apice emarginatæ.

Hab. Namaqualand, *E. G. Alston*. Flowered in Grahamstown, May–Sept. 1899.

Mode of growth same as in *C. deltoidea*, but owing to the shape of the leaves being different, the leaf-covered stem has not the same compact appearance as in *C. deltoidea*, and only four or five leaf pairs all fresh, the lower ones shrivelling up at an early stage. Peduncle erect, 1–1·5 mm. in diameter, minutely papillose. Calyx a little more than half the length of the corolla, not so thick as in *C. mesembrianthoides*. Corolla dull white, almost cylindrical, as the lobes are not recurved; lobes ovate. Carpels 2 mm. long, ·75 mm. broad at the broadest part. Stigmas sessile.

C. elegans, sp. nov. ad *C. deltoideam* Thunb. accedens. Caulis dense foliatus. Folia suborbicularia imbricata carnosa pallide viridia glabra, superne apicem versus applanata ad basin excavata, sæpissime c. 1·0 cm. longa. Pedunculus brevis subglaber. Bracteæ breves oppositæ. Calyx quam corolla vix duplo brevior, calycis lobi dorso tenuiter papillati. Petala alba recurva ovata vel oblongo-ovata mucronulata, c. 2·5 mm. longa. Stamina quam petala breviora. Squamæ ut in congeneribus.

Hab. Garies, *E. G. Alston*, Oct. 1897. Flowered in Grahamstown, Dec. 1897.

Not so robust as *C. deltoidea* and *C. deceptor*, and much more branched, but otherwise of similar growth. Peduncle rather short, subglabrous, with two pairs of bracts, usually reddish. Calyx less than half the length of the corolla, here and there with a reddish tinge, back of sepals covered with minute papillæ. Corolla bell-shaped, petals recurved white, lobes ovate, mucronulate. Stamens, pistils, and squamæ very much as in allied species. Sometimes the peduncle is about 1·5 cm. long and inflorescence somewhat compact, at other times it is longer (3–4 cm.) and inflorescence much laxer.

The following table of the characters which differentiate these five species of *Crassula* may be of service. They all agree in having the stems closely covered with fleshy leaves, and are all more or less allied to *C. deltoidea* Thunb. The measurements given of the length of the leaf-covered portion of the stem are only provisional, and taken from the specimens examined, and will doubtless have to be modified when further material comes to hand. None of these species are closely allied to *C. ericoides*, with which *C. deltoidea* has hitherto been united in the group *Imbricatæ*. *C. ericoides* has its nearest allies among the group *Subulares*, whereas *C. deltoidea* and its allies should be placed at the end of the sect. *Eucrassula*, leading to the sect. *Globulea*.

Dr. C. de Keissler has recently described another species, C. MUCRONATA,* which he places in Harvey's group *Imbricatæ*, but this species has no close affinity with *C. deltoidea* and its allies.

* Ann. K.K. Nat. Hof Museum, 1900, p. 37.

C. ELEGANS.	*C.* DELTOIDEA.	*C.* DECEPTOR.	*C.* CORNUTA.	*C.* MESEMBRIANTHOIDES.
Not so robust as *C. deltoidea* and *C. deceptor*.	Stem thick, ascending, densely covered by leaves, forming a quadrangular column.	More thickset and shorter than *C. deltoidea*.	Owing to shape of leaves, the leaf-covered stem has not the same compact appearance as *C. deltoidea*.	Branched from the crown with a thick caudex in wild specimens. Stem not so densely covered with leaves as in most of allies.
Lengthofleaf-covered portion of stem 3–4 cm.	Length of leaf-covered portion of stem reaching 8 cm.	Length of leaf-covered portion of stem 4–5 cm.	Length of leaf-covered portion of stem ± 5 cm.	Length of leaf-covered portion of stem ± 4 cm.
Leaves pale green, suborbicular, quite glabrous, inside flattish at tip and excaved below.	Leaves perfoliate, very thick, fleshy, almost semi-orbicular, glaucous-pulverulent.	Leaves firmer in texture than in *C. deltoidea*, tessellate on back and upper portion of inside.	Leaves glaucous, connate, quadrifarious, ovate, only 5–6 pairs are fresh, rest shrivelling up.	Leaves connate, always fleshy, 1·5–2·0 cm. long, more or less flattened above, sometimes mucronulate.
Peduncle short, subglabrous, 1–2 cm. long.	Peduncle about 8 cm. long, closely covered with short greyish papillæ.	Peduncle 2–3 cm. long, densely covered with grey papillæ.	Peduncle 4–6 cm. long, but sometimes longer.	Peduncle terminal, 6–8 cm. long.
Calyx less than ½ length of corolla.	Calyx about ½ length of corolla.	Calyx more than ⅔ length of corolla.	Calyx about ½ length of corolla.	Calyx more than ⅔ length of corolla.
Corolla bell-shaped, petals recurved, white.	Petals white, mucronulate, slightly recurved.	Petals a dirty cream white, slightly recurved, leaving only a very narrow opening.	Corolla dull white, almost cylindrical, as petals not recurved.	Corolla constricted near the apex, opening very narrow, petals white, narrow ovate.

C. tenuipedicellata, sp. nov. Annua. *C. glabræ* affinis. Caulis gracilis filiformis dichotome ramosus. Folia caulinia plana oblonga vel oblongo-ovata vel oblongo-oblanceolata, 8–11 mm. longa, 3–5 mm. lata, sessilia vel subsessilia, apice obtusa vel subacuta, sæpissime patentia. Flores pentameri minuti in cymam laxam et paniculatam dispositi, pedunculis pedicellisque gracilibus, filiformibus, bracteis foliis similibus sed multo minoribus. Calycis lobi obovato-spathulati basi connati, apice minute papillosi, 1·5 mm. longi. Petala ovata subacuminata, cr. 1 mm. longa. Carpella 1–2-ovulata, dorso papillosa, stylis tenuibus brevibus. Squamæ magnæ clavatiformes.

Hab. On the hills near Arakup, Western Region, alt. 2300 ft. In flower and fruit 14 Sept. 1897, *R. Schlechter*, no. 11247.

A small dichotomously branched annual allied to *C. glabra*, with small pentamerous flowers in lax paniculate cymes. Sepals obovate, spathulate, obtuse, minutely papillose at the apex, a little longer than the petals. Petals ovate, subacuminate, ± 1 mm. long. Carpels 1–2-ovuled, narrowing rather abruptly at the apex into the short style. The squamæ are rather large, and club-shaped in outline.

This plant is also allied to certain members of the section *Bulliarda*, but differs in being pentamerous.

C. minutiflora, sp. n. Planta decumbens gracilis, ± 5·5 cm. alta. Caulis filiformis trichotome ramosus, habitu *C. tenuipedicellatæ* Schönld. & Bak. fil. Folia opposita ovata plana sessilia, 2·0–2·5 mm. longa, cr. 2·0 mm. lata. Flores breviter pedicellati numerosi, ad apicem ramulorum aggregati, pentameri minutissimi. Pedicelli 1–1·5 mm. longi. Calycis lobi ovati vel oblongo-ovati, circ. ·7 mm. longi, apice subobtusi. Petala calyce subæquilongia, in sicco pallide lutea. Stamina quam petala breviora, filamentis gracillimis, antheris in sicco flavis rotundatis. Carpella circ. ·5 mm. longa, stylo brevi quam longitudine carpellæ pluries breviori.

Hab. Namaqualand, Steinkopf, on hills, alt. 2900 ft., *R. Schlechter*, no. 11496, 2 Oct. 1897.

C. tenuipedicellata Schönld. & Bak. fil. and *C. minutiflora* both belong to Harvey's section *Glomeratæ*.

A slender branching little annual allied to *C. tenuipedicellata* Schönld. & Bak. fil. Stem filiform, trichotomously branched, and rooting at lowest nodes. Leaves opposite, ovate. Flowers small and rather numerous, collected at the ends of the branches, shortly pedicellate; pedicels circ. 1·5 mm. long. Sepals reddish externally, ovate or ovate-oblong. Petals when dried yellowish white, about as long as the sepals. Anthers round, filaments very slender. Carpels oblong or ovate-oblong, about ·5 mm. long, the length being about twice the breadth. Style short, slender, about ·2 mm. long.

C. (Bulliarda) **Leipoldtii**, sp. nov. Annua. Caulis gracilis filiformis ramosus, 6–7 cm. altus, ad *B. trichotomam* E. Z. accedens. Folia caulinia linearia vel lineari-lanceolata, 6–8 mm. longa, 1–1·5 mm. lata, sæpissime patentia, internodiis 9 mm.–1·3 cm. longis.

Flores in cymam laxam dispositi, pedicellis filiformibus usque ad 6 mm. longis, bracteis foliis similibus sed minoribus. Calycis lobi 4, lanceolati, ± 3 mm. longi, basi connati acuti, dorso carinati vel subcarinati. Petala 4, oblongo-ovata, ± 2 mm. longa, basi connata, quam sepala distincte breviora. Stamina quam petala breviora. Carpella stylis brevibus vix 1 mm. longis, quam sepala paulo breviora pluriovulata. Squamæ obcuneatæ, apice leviter rotundatæ.

Hab. Clanwilliam, *Leipoldt*, no. 392.

A small annual with deeply parted calyx, the lanceolate acute sepals being distinctly longer than the petals. The leaves are linear as in *B. trichotoma* E. & Z. It differs conspicuously from *B. Vaillantii* DC. in the calyx.

C. Tysoni Schönland, n. sp. Herbacea diffusa, c. 20 cm. alta. Caulis adscendens, basi radicans hirsutus, internodiis 2–4 cm. longis, foliis planis (?) obovatis basi attenuatis vel ovatis acuminatis connatis inferioribus c. 2 cm. longis, superioribus sensim minoribus sparse hirsutis vel subglabris. Inflorescentiæ terminales laxe cymoso-corymbosæ subumbellatæ, floribus pedicellatis, pedicellis hirsutis filiformibus 3–5 mm. longis. Sepala basi connata, c. 2·5 mm. longa, lobis ovato-lanceolatis acutis subglabris. Petala ovata, apice leviter contracta, c. 3 mm. longa. Stamina c. 2·5 mm. longa, filamentis filiformibus, antheris late ovatis. Carpella c. 2·5 mm. longa, stylis subulatis c. 1 mm. longis, squamis minutis subrectangularibus, apice rotundatis emarginatis.

"In saxosis circa Kokstad Griqualand Orientalis," Feb. 1883, alt. 5000 ft., leg. W. Tyson, no. 1342.

This species seems to be nearly allied to *C. diaphana* E. Mey., but, besides being larger and more luxuriant, it differs both in calyx and corolla; in its mode of growth it resembles greatly *C. Woodii* Schönl., but this latter species is perfectly glabrous, has smaller flowers, and shows other differences.

C. loriformis, sp. nov. Species habitu *C. Promontorii* Schönld. & Bak. fil. Caulis herbaceus simplex, ± 4 cm. altus. Folia glabra, lamina rotundata vel latissime ovata, margine crenato-serrata, 1·5–2·0 cm. lata, basi interdum gradatim cuneata, interdum subito cuneata. Flores pentameri in cymas terminales dispositi pauci, pedicellis brevibus. Calycis lobi late ovati obtusi, dorso rotundati, ad basin connati, cr. 1·25 mm. longi quam lobi *C. Promontorii* Schönld. & Bak. fil. latiores. Petala viridia lata subpanduriformia acuta, cr. 3 mm. longa, 2·5 mm. lata, ideo quam petala *C. Promontorii* latiora. Stamina quam petala breviora. Carpella stylis filiformibus. Squamæ oblongæ apice rotundatæ longiores quam latæ.

Hab. Kloof over Hex River East Station, *Major Wolley Dod*.

An interesting plant belonging to the *Crenato-lobatæ*, and allied to *C. Promontorii* Schönld. & Bak. fil. Differs in many particulars from this species—(*a*) The ultimate pedicels are short in *C. loriformis*, while in *C. Promontorii* they are rather long; (*b*) the sepals are broader, as in *C. Promontorii* they are lanceolate; (*c*) the petals are broader, and of a greenish colour; (*d*) the connective of the stamens is broader. The leaves in the specimen examined vary

considerably in outline; sometimes they are nearly round, sometimes they are very broadly ovate, contracting suddenly to a cuneate base of nearly a cm. in length. The margin is crenate-serrate. Sepals broadly ovate, blunt, rounded on the back, connate at base, lobes about 1·25 mm. long. Petals broad, subpanduriform, acute, about 3 mm. long, 2·5 mm. broad. Connective of stamens broad. Carpels with a much longer style than in *C. Promontorii*. Squamæ perfectly strap-shaped, rounded at the apex, a point which alone would make this noticeable.

C. argyrophylla Diels MS. Perennans. Caulis brevis dense foliatus. Folia obovata interdum inæquilateralia plana confertim utrinque albo-cinereo-hirta, internodiis multoties longiora, margine undulata vel subundulata, 3·0–3·2 cm. longa, 2·0–2·2 cm. lata, ideoque circiter $1\frac{1}{2}$-plo longiora quam lata. Flores in cymam corymbosim dispositi. Pedunculus erectus confertim cinereo- vel subferrugineo pubescens, bracteis oppositis lanceolatis. Calycis lobi oblongi obtusi, extrinsecus cinereo-pubescentes, quam petala breviores. Petala ovato-lanceolata concava, post apicem breviter obtuse mucronata, 2·5 mm. longa. Carpella sursum attenuata. Squamæ oblongo-obcuneatæ, apice leviter emarginatæ longiores quam latæ.

Hab. Braamfontein, near Johannesberg, alt. 6000 ft., Jan.–Feb. 1899, *D. F. Gilfillan*, *Herb. Galpin*, no. 6211. Transvaal, District Lydenberg, *Dr. F. Wilms*, no. 527. June, 1888.

Peduncle erect, 7·0–10·0 cm. long or rather more, cinereous or rusty pubescent. Flowers in a corymbose cyme; bracts opposite, lanceolate, cinereous pubescent. Sepals oblong cinereous, pubescent, obtuse. Petals longer than sepals, ovate-lanceolate, concave with a short bluntish mucro just behind the apex, 2·5 mm. long. Stamens distinctly shorter than the petals, about the same length as the carpels. Carpels gradually tapering above. Squamæ oblong-obcuneate, apex slightly emarginate, rather longer than broad, under 1 mm. long.

C. (Globulea) **Rattrayi**, sp. nov. Perennans, ± 9 cm. alt. Caulis brevis simplex dense foliatus. Folia subradicalia subrosulata spathulata, apice obtusa connata utrinque glabra flaccida non rigida ut in congeneribus proximis, usque ad 3·5 cm. longa et 12 mm. lata, ideoque sub triplo longiora quam lata. Pedunculus scapiformis minute pubescens, bracteis oppositis parvis, basi connatis. Cymulæ superiores sessiles vel subsessiles, inferiores pedunculatæ paucifloreæ. Calyx extrinsecus minute pubescens, calycis lobi oblongi obtusi, margine ciliati concava. Petala alba, ± 2 mm. longa, quam sepala longiora erecta oblonga, ad apicem globulum carnosum ferentia ut in reliquis sectionis *Globulæ*. Carpella quam petala distincte breviora sursum attenuata. Squamæ subobcuneatæ apice leviter emarginatæ, circa ·5 mm. longæ, longiores quam latæ.

Hab. Graaf Reinet, *G. Rattray*, no. 30.

Leaves subrosulate, spathulate or oblanceolate, greatest breadth about one-third from the apex, obtuse, glabrous on both surfaces and on the margins, not rigid as in allied species. Peduncle scapiform, bracts opposite, connate, small. Calyx just over 2 mm. long.

Sepals oblong, obtuse, concave, externally minutely pubescent; margin ciliate. Petals oblong, with a globose fleshy gland immediately behind the apex, 2 mm. long or a little longer. Stamens a very little longer than the carpels. Carpels distinctly shorter than the petals. Squamæ subobcuneate, rather longer than broad, apex slightly emarginate, about ·5 mm. long.

HIERACIUM MURORUM AND H. CÆSIUM OF BRITISH FLORAS.

By Frederic N. Williams, F.L.S.

In revising the list of British Hawkweeds it is desirable to compare series of specimens with series of continental specimens, regardless of the specific names which such authentic specimens bear. And in the first place a few fundamental misconceptions ought to be removed. Linnæus described *H. murorum*, var. *α*, var. *β*, and var. *γ*. The second, which Linnæus called "var. sylvaticum," Gouan raised to specific rank as *H. sylvaticum*,* and its rank as a species has not been assailed. He added two other varieties, which, however, do not impair the stability of the species. Fries took out var. *α* and called it "Hieracium cæsium." It is obvious, therefore, that, if the Linnean name be retained at all, which is certainly desirable, it should be made to apply to var. *α*, and not to var. *β*. This in the best continental floras has been done; and Scandinavian botanists have also now rejected the *dictum* of Fries. All English floras retain the Linnean specific name, but apply it erroneously to var. *β*. Fries himself writes in his *Epicrisis gen. Hierac.*;—"*H. cæsium* est genuinum *H. murorum α* Linn., monente Wahlenbergio, solum ut Upsaliæ in muris nascens, *H. murorum* omn. auct. rec. est H. murorum sylvaticum L. (cf. Linn. Suec.) et tantum in silvis obvium." On the other hand, *H. cæsium* as described by Fries can not be made to apply to any British plant, as Syme† implies in his description of *H. flocculosum*; and Mr. J. G. Baker long ago‡ described the so-called British "H. cæsium" under the name of *H. cæsium* var. *Smithii*, which is the well-known plant of the limestone scars of Yorkshire, found also at Kirkstone, in Northumberland. This is the "H. murorum" of Smith,§ but *not* of Linnæus, though Smith adds the Linnean synonyms. *H. flocculosum* Backh. is again a well-known plant of whose identity there is no doubt, and differs but little, and by no specific characters, from *H. cæsium* var. *Smithii*. As Mr. Baker says, Backhouse's *H. flocculosum* differs from it only in having two cauline leaves, and in the radical leaves being hoary on both sides with thin stellate down. This being the case, and the true *H. cæsium* of Fries not being applicable to any known British specimens, it

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* Illustr. Obs. Bot. p. 56 (1773).

† Engl. Bot. ed. 3, v. p. 194.

‡ Journ. Bot. 1879, p. 361.

§ Engl. Bot. xxix. t. 2082.

follows that *H. murorum* should disappear from the British list. I suggest, therefore, that the British "H. cæsium" so-called should be merged in *H. flocculosum* as a variety, and, as Mr. J. G. Baker was the first to suggest a solution of the difficulty, perhaps his name might be associated with it instead of that of Smith, who was first responsible for the confusion. Lastly, "H. murorum" of British floras (var. β of Linnæus) becomes *H. silvaticum** Gouan. By most authorities Wallroth† is credited with the name, but on reference it is found that he duly cites Gouan as the authority for the plant as a species. The specimens in the Linnean Herbarium clearly indicate, it seems, what plants Linnæus intended to be designated by the name *murorum*, though Mr. F. J. Hanbury arrives at the opposite conclusion.‡ In the last edition of the London Catalogue *H. murorum* (no. 952) has twenty-four varieties. Some of them, however, were not cited by the authority for the variety as under *H. murorum*, and those of them which stand will, in future, have to be cited as under *H. silvaticum*. To take a few *seriatim*:—

Var. b. *micracladium* has never been described at all, but was issued in a set of dried specimens as "H. silvaticum var. micracladium" Dahlstedt, Hierac. Skand. exs. iv. n. 59.

Var. d. *Stenstroemii* was published as "H. serratifrons var. Stenstroemii."

Var. e. *pellucidum* was described by Laestadius as a species in Kongl. Svensk. Vetensk. Akad. Handling. 1824, p. 172, and reduced to a variety by Almquist (1881).

Var. g. *crassiusculum*. This plant is not mentioned in Dahlstedt's long memoir; possibly it was issued in *exsiccatæ*, as it only occurs as a varietal name in "H. macranthelum var. crassiusculum Almq.," a species of the *Pilosella* group.

Var. j. *lepistodes* seems to have been published as *H. vulgatum* var. *lepistoides* Dahlst.

Var. w. *sarcophyllum* was first described as "H. silvaticum var. sarcophyllum," Stenstroem, Värml. Archier. 1889.

Var. y. *subulatidens* was described by Dahlstedt as "H. grandidens var. subulatidens," a name given by him to the earlier and more correct "H. silvaticum var. triangulare" of Lönnroth, Resa Smal. Gotl. p. 89 (extr. Kongl. Svensk. Vetensk. Akad. Förhandl. 1882), and under which latter name it should stand in any prospective list.

While on this variable species, it may be pointed out that no. 945, *H. stenolepis*, has been reduced to a variety of *H. silvaticum* by Almquist,§ with Dahlstedt's concurrence.

In many forms of this group the leaves are blotched with purple patches, and in descriptions the term used is "maculata," which is scarcely applicable, as they can not be said to be merely spotted.

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* In the masculine form "silvaticus" and "silvester" are to be preferred to "sylvaticus" and "sylvestris," as in spite of the statements of some grammarians the "y" is not of Greek origin, but is corrupt late-Latin.

† Sched. Crit. Pl. Halens. p. 422 (1822).

‡ Journ. Bot. 1892, p. 259.

§ Studier ofver slagtet *Hieracium*, p. 12 (1881).

As no suitable term is to be found in Mr. B. D. Jackson's exhaustive and comprehensive *Glossary*, I suggest the term "centonate" as expressing this character (*cento* = patch-work, or a patched coat)—a word which occurs first in the writings of Cato.* Such leaves may be said to be "purpureo-centonata."

WEST LANCASHIRE NOTES.

By C. E. Salmon, F.L.S., and H. S. Thompson, F.L.S.

In August, 1901, we spent four days in the north-western portion of the county of Lancashire; the following notes are on the more important of the plants collected. The country west of Pilling deserved further examination, but we were unfortunately pressed for time. All the localities are in v.-c. 60, and those plants that appear to be new to that vice-county are distinguished by an asterisk. Aliens are marked †.

Nasturtium palustre DC. Between Lytham and Guide House Inn.

Sisymbrium officinale Scop. var. **leiocarpum* DC. Shore near Guide House Inn, and also near Freckleton.—*S. Sophia* L. Knott End.

Cakile maritima Scop. Between Lytham and St. Annes; between Guide House Inn and Naze Mount.

Viola. On the sandhills between Lytham and St. Annes an interesting pansy occurs. On submitting specimens to Mr. E. G. Baker, a wholly yellow-flowered plant was labelled: "*V. Curtisii* Forst. *a Forsteri* H. C. Wats., forma"; upon other specimens, with flowers purple and yellow, he wrote: "A member of the *V. Curtisii* series. This violet is more nearly allied to *V. Pesneaui* Lloyd & Foucaud, Fl. Ouest Fr. p. 48, than to any other pansy with which I am acquainted. *V. Pesneaui* is more strongly pubescent, and the lateral petals are usually violet-coloured. *V. sabulosa* Boreau, which has been recorded from near Lytham, differs in having much longer narrower lamina to the leaf."

Sagina nodosa Fenzl. Between Lytham and St. Annes.

Buda media Dum. Shore east of Lytham.

Genista tinctoria L. Between Lytham and Guide House Inn.

Ononis spinosa L. Near Pilling; between Guide House Inn and Naze Mount.

Trifolium fragiferum L. Near lake, Ansdell; between Guide House Inn and Naze Mount.

Eryngium maritimum L. Between Lytham and St. Annes; between Guide House Inn and Naze Mount.

Apium graveolens L. Near Pilling; near lake, Ansdell; between Guide House Inn and Naze Mount.

Œnanthe Lachenalii Gmel. Near lake, Ansdell.

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* *De Re Rusticâ*, 59,—"quoties cuique tunicam aut sagum dabis, prius veterem accipito, unde *centones* fiant."

Parnassia palustris. Rather sparingly between Ansdell and St. Annes.

Inula Conyza DC. Between Ansdell and St. Annes.

†**Matricaria discoidea* L. Abundant by roadside at Freckleton.—*M. inodora* L. var. *salina* Bab. Ansdell.

Chrysanthemum segetum L. Between Pilling and Cockerham Moss.

**Arctium nemorosum* Lej. Roadside near Pilling.

Carlina vulgaris L. Between Ansdell and St. Annes.

Hieracium umbellatum L. var. **coronopifolium* (Bernh.) (*fide* E. S. Marshall). One spot on the sandhills between Lytham and St. Annes.

Andromeda Polifolia L. Cockerham Moss.

Pyrola rotundifolia L. var. *maritima* (Kenyon). Not confined to one spot, on the sandhills between Ansdell and St. Annes.

Limonium vulgare Mill. (*Statice Limonium* L.). Knott End.—*L. humile* Mill. (*S. rariflora* Drej.). Growing with the above at Knott End. Small and rather starved-looking, very different in aspect from the plant called "*rariflora*" growing near Chichester, in Sussex, etc. However, Drejer's plant (of which I have seen a type-specimen in the Dublin Herbarium) matches this Knott End sea-lavender very well; the same cannot be said of the Sussex plant, to which also the name "*humile*" is most inappropriate. I suspect two forms or varieties, and hope to be able to go more fully into the question in the near future (C. E. S.).—*L. occidentale* O. K. On the sandy raised embankment that runs from Knott End towards Pilling there grows a magnificent belt of this plant. It is the form called "var. *intermedia*" by Syme. I hope to refer to this in a paper in course of preparation (C. E. S.).

†*Campanula rapunculoides* L. Between Lytham and Ansdell, but introduced, we think, in this station.

Samolus Valerandi L. Near Pilling; near lake, Ansdell.

Erythræa. On sandy ground near Ansdell a remarkable series of plants occurred. *E. littoralis* Fr. was there in some plenty, recognizable at a glance by its rich and deeper-coloured flowers and narrow leaves. *E. pulchella* Fr. and *E. Centaurium* Pers. also grew with it, the latter occasionally varying with pure white flowers. —*E. pulchella* Fr. varied much in size; a very small delicate little form, about ½ in. high and usually single-flowered, is perhaps var. *Swartziana* Wittr., with which it agrees in description; it is often tetramerous. The more familiar much-branched plant, with numerous flowers, also occurred. With the above grew a good many plants that seemed to be neither exactly *littoralis* nor *Centaurium;* the flowers were of the *littoralis* type, with long calyx, and corolla richly coloured; the stem-leaves, however, were decidedly not linear, but broader, and of a different *texture* from those of *littoralis*, and the branches of the cymes were elongated, and the subsessile flowers much more distant from one another than is usual in this species. The plants, on being examined, contained no (or very rarely a few) seeds in their almost ripe capsules, and the thought that they might prove to be hybrids

between *littoralis* and *Centaurium* may possibly be the explanation of this puzzling form; but the matter requires further study before giving a definite opinion (C. E. S.).

Gentiana Amarella L. This occurred with white flowers near the lake, Ansdell.

**Cuscuta Epithymum* Murr. Near lake, Ansdell.

Hyoscyamus niger L. Between Lytham and Guide House Inn.

Linaria viscida Moench. Between Pilling and Cockerham Moss.

Scrophularia umbrosa Dum. Sparingly in one spot between Lytham and Guide House Inn.

Mentha sativa L. var. *rivalis* Lond. Cat. Near Pilling.

Stachys arvensis L. Near Freckleton; St. Annes.

Galeopsis versicolor Curt. Rare between Lytham and Guide House Inn; plentiful and very fine between Pilling and Cockerham Moss.

Chenopodium rubrum L. Sparingly between Lytham and Guide House Inn.

Atriplex littoralis L. Between Knott End and Pilling. — *A. laciniata* L. Knott End, plentiful; Ansdell. — *A. portulacoides* L. Between Lytham and Guide House Inn, and near Knott End.

Polygonum Raii Bab. Knott End, rather plentiful; Ansdell.

**Rumex maritimus* L. Rare between Lytham and Guide House Inn. — *R. crispus* L. var. **trigranulata* Syme. Plentiful at Knott End, where it is conspicuous by its strictly erect habit, and very noticeable fruits bearing large tubercles on all the inner sepals.

**Euphorbia Paralias* L. Sandy ground, Ansdell.

**Mercurialis annua* L. A few plants at Knott End.

Epipactis palustris Crantz. Sparingly between Ansdell and St. Annes.

Juncus compressus Jacq. and *J. maritimus* Lam. Shore between Lytham and Guide House Inn. The former is not usually a salt-marsh plant.

**Sparganium neglectum* Beeby and *S. simplex* Huds. Growing together in a small pond between Lytham and Guide House Inn.

**Eriophorum vaginatum* L. Cockerham Moss.

Rynchospora alba Vahl. Cockerham Moss. It is satisfactory to be able to report this still here in 1901, after Messrs. Wheldon and Wilson's remarks in Journ. Bot. 1900, p. 46. It was in fair quantity. We saw no signs of *Drosera anglica* or *Carex limosa*.

**Carex curta* Good. Cockerham Moss. — **C. distans* L. Knott End; near lake, Ansdell.—*C. extensa* Good. Between Lytham and Guide House Inn.

**Agrostis nigra* With. Field near Cockerham Moss, plentiful (confirmed by A. Bennett and A. H. Wolley-Dod).

Lepturus filiformis Trin. Coast between Knott End and Pilling.

SHORT NOTES.

Yorkshire Brambles.—I send a note of some brambles collected in Yorkshire, in July, 1901, which Rev. W. Moyle Rogers has kindly examined for me. New vice-county records have a star prefixed:—*Rubus fissus* Lindl. By the canal, Medge Hall, S.W. Yorks, v.-c. 63. —*R. plicatus* W. & N. Skipworth Common, S.E. Yorks, v.-c. 61.—**R. opacus* Focke. Skipworth Common, v.-c. 61. "The first N. England specimens I have seen," W. M. R. — *R. Selmeri* (Lindeb.). Medge Hall, v.-c. 63. — **R. Sprengelii* Weihe. Skipworth Common, v.-c. 61. — **R. pyramidalis* Kalt. Skipworth Common, v.-c. 61. This is not quite the same as our Irish plant, which is larger, and has immense panicles. — *R. leucostachys* Schleich. Doncaster, v.-c. 63. — *R. podophyllus* P. J. Muell. On banks of Don above Doncaster, v.-c. 63. "A very strong form. Indistinguishable from the very strong form from the Dewsbury neighbourhood," W. M. R.—*R. cæsius* L. Conisborough, v.-c. 63.—C. H. Waddell.

Sagina Reuteri Boiss.—This plant was again met with in Worcestershire, on the gravel walks of Cotheridge Court, on the occasion of a visit there of the Malvern Field Club on June 19th. As it has now been gathered from three Worcestershire stations, at considerable distances apart, and also in Herefordshire and Pembrokeshire, I think there seems good reason to regard it as indigenous.—Richard F. Towndrow.

Hutchinsia petræa in Breconshire.—I discovered *Hutchinsia petræa* R. Br. in very small quantity on the limestone of Craig Cil-le, near Crickhowell, on June 11 of this year. This is the locality for *Pyrus minima* Ley. It makes a new record for v.-c. 42. H. J. Riddelsdell.

Gentiana tenella. — A curious blunder of wide acceptance has recently come to my knowledge, in consequence of its occurrence in a proof which passed through my hands a few weeks ago. In it there was this statement:—"*Gentiana tenella*, Fries, in Act. Hafn. x. p. 346." As I wished to insert the date of the volume, I referred to the *Index Kewensis*, and there saw a very different authority and page, with the date 1770; the elder Fries was not born till 1794, and therefore it was a manifest impossibility that the species should be of his describing, twenty-four years before his birth. Tracing the error back, through Hooker's *Flora of British India* (iv. p. 109), and the *Journal of the Linnean Society* (Botany), xiv. (1875) p. 434, I came to this form in DC. Prod. ix. p. 98 (1845), where Grisebach monographed the *Gentianaceæ*, as "Fries in act. Hafn. 10, p. 436, t. 2, f. 6, a. 1770." This was an altered form of the formula employed by the same author in his *Gen. et Sp. Gent.* p. 248 (1839), where it runs thus: "Friis in act. Hafn. 10, p. 436." I had suspected the source of error before I arrived at this, and it may now be confidently said that Grisebach had formerly referred to the original place of publication, where C. Friis Rottböll described and figured the species; but when he came to deal with the same plant

in DC. Prod., he failed to realize his mistake of having cited the Christian name only in his earlier work, and by some slip of the pen or printer's error the name was altered to "Fries." From the foregoing it will be inferred that the true citation should run: "*Gentiana tenella*, Rottb. in Kiöb. Skr. Selsk. x. (1770) 436."—B. Daydon Jackson.

An Orchis Hybrid.—In Journ. Bot. 1899, 360, there is a notice of an orchid believed to be a hybrid between *Orchis maculata* L. and *Habenaria conopsea* Benth., found near Sevenoaks. In my herbarium I have a specimen under label "Bangor, Wales, July, 1888, W. H. Painter," which is intermediate between these two species, and seems to me to be an undoubted case of the hybrid: type *O. maculata* accompanies it. This is from Carnarvon, v.-c. 60. In the spring Mr. Wm. Whitwell sent me his series of *O. maculata*, asking me to separate out my subsp. *ericetorum;* and among them was a specimen from near Oswestry, Salop, v.-c. 40, which I have no hesitation in saying is also *O. maculata* × *Habenaria conopsea*. Since orchids, as I am given to understand, can easily be crossed in cultivation, it is not surprising that hybrids in this order (even between species of different genera) should occur in nature,—E. F. Linton.

NOTICES OF BOOKS.

The Primrose and Darwinism. By a Field Naturalist, M.A. Camb. 8vo, pp. 233, with 23 figures in the text. London: Grant Richards. Price 6s.

After reading the greater part of the book, we close it with a sigh of relief—"Field Naturalist" is not convincing. By patient observation and experiment Darwin was able to render intelligible certain floral arrangements. It has since been shown that his deductions as to the necessity or advantages of cross-fertilization as compared with self-fertilization were too far-reaching, though the value of the observations is recognized. The present writer severely criticizes the observations, the methods of experiment, and the conclusions of Darwin, as set forth in his books dealing with cross- and self-fertilization and forms of flowers.

The chief point of criticism seems to be the supposed sterilizing influence of the net used by the observer to isolate the flowers or plants with which he was experimenting. These results, says the writer, are unnatural, because conducted under unnatural conditions. The primrose is not prevented from setting seed when under the net because insects are excluded, but because the interposition of the net prevents the proper maturation of the pollen by the sun's rays, and hence induces a self-sterility. And yet a few pages further on an experiment by Meehan is quoted, in which every flower of a patch of clover perfected seeds beneath a wire net. Clearly, then, the interposition of the net was not detrimental to ripening of the pollen in this case. And, apart from cleistogamic

flowers, which may be regarded as special cases, there are many in which pollen is already mature when the bud opens. Why did not Field Naturalist make experiments to ascertain whether the pollen was, or was not, affected by the net? Again and again the presumed sterilizing effect of the net is put forward, but in every case such effect is deduced, not proved. Similar absence of experimental proof is noticeable elsewhere in connection with the primrose. The writer criticizes Darwin's assumption that, because insects' visits were not observed during the day, the flowers were therefore pollinated by nocturnal insects. But he himself is in exactly the same position, when, failing to see diurnal visits, he assumes that nocturnal do not take place. Both positions are unjustifiable without experiment.

Darwin's statement that the pollen of *Linum perenne* and other flowers is in its action on the stigma of the same flower as ineffectual as so much inorganic dust, may, and probably does, need re-examination. Field Naturalist, however, makes, as far as we can see, no attempt at re-examination; he merely contents himself with criticizing the previous workers' methods and results.

The book is disappointing. There is too much of criticism, too little of observation. After reading it, we feel that we are no further on, and almost regret the time spent in the perusal.

A. B. R.

Abweichende Blüten heimischer Orchideen mit einem Rückblick auf die der Abietineen. By Dr. K. Gustav W. Stenzel. 4to, pp. 136, tt. 6. Stuttgart: Nägele. Price 28 marks.

The malformation of the flower of endemic orchids is treated in detail by Dr. Gustav Stenzel in a recent number (Heft 55) of the *Bibliotheca Botanica*. In an introductory chapter the author discusses the value, from the point of view of morphology, of malformations generally, with special reference to the female cone of *Abietineæ*. He reviews the various cases which have been described by himself and others, from Alexander Braun onwards, and their bearing on the vexed question of the morphology of the female cone in *Abietineæ* and other conifers. He concludes by expressing his conviction of the value of malformations in the solution of problems in morphology and phylogeny, especially in cases where they present a series of transitional forms.

As regards the orchids, the author has confined himself to cases of departure from the normal type occurring in endemic species under natural conditions, and also, with few exceptions, to floral malformations. The examples, the description of which occupies eighty-eight quarto pages, are arranged in sections and subsections. Distinction is drawn between abnormalities arising on the one hand from an alteration in the number of the parts of the flower, and on the other from conversion of one floral member into another. The former is much the larger class, and includes the following sections:—dimerous flowers, two-leaved flowers, one-leaved flowers, cohesions, tetramerous flowers, pentamerous flowers, fissions, and

increase in number of stamens. Incidentally the author discusses the bearing of the phenomena on problems of floral morphology. For instance, as to the structure of the inferior ovary, which, though generally regarded as representing the union between three carpels and the interior of a hollow floral axis, has also been explained as arising from the union of the carpels with the lower portions of the perianth leaves, the axis taking no part in its formation. The latter view is based mainly on abnormal cases. Dr. Stenzel finds that abnormalities may be cited in favour of either view, and the question cannot therefore be settled on this ground.

There is a bibliographical appendix, and also a large number of figures (167) arranged in six quarto plates. The work is a useful addition to the literature of plant teratology; though from the point of view of the orchids it cannot be said to throw any new light on floral morphology. It affords rather an interesting example of the wonderful variety of mishaps that may befall a highly elaborate flower.

A. B. R.

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*ARTICLES IN JOURNALS.**

Annals of Botany (June).—R. H. Yapp, 'Two Malayan 'myrmecophilous' Ferns, *Polypodium carnosum & P. sinuosum*' (3 pl.).—H. M. Ward, 'On relations between host and parasite in the Bromes and their Brown Rust, *Puccinia dispersa*.' — T. G. Hill, 'Variation in flowers of *Primula*.'—E. B. Copeland, 'Mechanism of Stomata' (1 pl.).—W. T. Thiselton-Dyer, 'Evolution of pitchers in *Dischidia*' (2 pl.). — J. B. Farmer & T. G. Hill, 'Arrangement and structure of vascular strands in *Angiopteris erecta*' (3 pl.). — F. E. Fritsch, '*Aphanochæte*.'—Id., 'Germination of zoospores in *Œdogonium*.'

Botanical Gazette (17 June).—A. Rimbach, 'Subterranean organs of Californian *Liliaceæ*' (1 pl.). — R. E. Smith, 'Parasitism of *Botrytis cinerea*.' — C. H. Shaw, 'Development of Vegetation in morainal depressions of Woods Hole, Mass.'—J. E. Webb, 'Flower and embryo of *Spiræa*.'

Botanical Magazine (Tōkyō).—(20 May). J. Matsumara, '*Leguminosæ* of Japan' (contd.).—T. Makino, 'Flora of Japan' (cont.).—Id., '*Acer pycnanthum*.'

Bull. de l'Herb. Boissier (30 June).—J. H. Maiden, '*Eucalyptus tereticornis* & *E. rostrata*.'—O. & B. Fedtschenko, 'Flore du Caucase.'—F. N. Williams, 'Sur le genre *Mœnchia*.'—R. Buser, New species of *Alchemilla*. — H. Christ, 'Spicilegium pteridologicum austro-brasiliense' (cont.).

Bull. Torrey Bot. Club (20 June).—J. E. Kirkwood & William J. Gies, 'Chemical Studies of the Cocoanut [Coco-nut] during Germination' (1 pl.). — C. C. Curtis, 'Observations on Transpiration.'—G. J. Peirce, 'Forcible discharge of antheroids in *Asterella*.'—R. M.

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* The dates assigned to the numbers are those which appear on their covers or title-pages, but it must not always be inferred that this is the actual date of publication.

Harper, 'Distribution of *Taxodium*.'—A. Wilson, 'New plants from Wyoming.'

Gardeners' Chronicle (28 June). — A. Henry, 'Wild Chinese Roses' (figs. 170–172). —(12 July). J. Hoog, *Tulipa ingens*, sp. n. (fig. 7). — (26 July). Id., *Tulipa Wilsoniana*, sp. n.— 'Wild forms of *Clematis florida*, &c.' (fig. 20).

Journal de Botanique ("Mai"; received 26 June).—L. Guignard, 'Double fécondation chez les Solanées.' — F. Guégnen, 'Anatomie du style et du stigmate des Phanérogames' (cont.).

Journ. Linn. Soc. (xxxv, no. 245; 21 July).—F. Darwin, 'Method of investigating gravitational sensitiveness of root-tip.'—J. C. Bose, 'Electrical response in plants under mechanical stimulus.'—S. Moore, 'Composite Flora of Africa' (i. e. *Compositæ: Artemesiopsis*, gen. nov. Inuloideæ; 1 pl.). — H. & J. Groves, 'Linnean Specific Names.'— H. H. W. Pearson, '*Dischidia* with double pitchers' (1 pl.). — J. Percival, ''Silver-leaf' disease' (1 pl.). — Id., 'Calcium-oxalate crystals in seedlings of *Trifolium hybridum*.'

New Phytologist (25 June). — 'Towards an ideal botanical curriculum.' — R. Scott, 'Salt-water aquarium for algological experiments.' — E. Armitage, 'Delay in germination of seed of Euphorbias.'—F. F. Blackman & A. G. Tansley, 'Classification of Green Algæ' (cont.).

Oesterr. Bot. Zeitschrift (July). — A. Oborny, 'Zur *Hieracium*-Flora des oberen Murthales in Steiermark.'—J. Podpěra, *Ceratodon moravicus*, *Trichostomum devonicum*, spp. nn.—R. v. Benz, 'Hieracienfunde in den österreichischen Alpen.'—R. Wagner, '*Roylea elegans*' (concl.).—A. Hansgirg, 'Biologie der herabgekrümmten Laubblätter der *Aralia spathulata* & *Meryta Senfftiana*' (concl.). — E. Hackel, *Diplachne guatemalensis*, sp. n.—J. Freyn, 'Plantæ Karoanæ' (cont.: *Saussurea*).

Rhodora (9 May). — A. E. Bacon, 'Poisoning by *Cypripedium spectabile*'—R. M. Harper, *Lycopodium clavatum* var. *monostachyon*.' —B. L. Robinson, '*Veronica Chamædrys* in New England'—(June). F. S. Collins, 'Marine Cladophoras of New England' (1 pl.).— B. L. Robinson, 'Hypericums of *adpressum* group' (1 pl.). — M. L. Fernald, *Scutellaria Churchilliana*, sp. n.

Trans. Linnean Soc. (Botany, 2nd Series, vi. 3: "March," received July 22).—W. & G. S. West, 'Freshwater Algæ of Ceylon' (6 pl.).

BOOK-NOTES, NEWS, &c.

At the meeting of the Linnean Society on June 19th, Mr. George Massee described some of the results of modern methods of investigation in mycology, illustrating his remarks by means of lantern-slides. He pointed out the errors of some observers who urged the suppression of genera wholesale on the evidence of a few species, and pleaded for the retention of familiar names until a clear case for their suppression had been established on evidence furnished by pure cultures. He instanced the succession of generic

forms in orderly development from *Verticillaria Solani*, through *Fusarium Solani* and *Cephalosporium*, to *Nectria Solani*, which, with its resting-spores, closes the cycle of seasonal growth. He pointed out the difficulty of culture in the matter of parasitic species, a difficulty which might in the future be overcome, cultures hitherto having necessarily been confined to saprophytic species capable of growth in nutrient media.

The latest part of the *Bibliotheca Botanica* (Heft 57, Stuttgart, 1902) consists of a paper by F. Heydrich on the tetrasporangium of the *Florideæ*, in which he continues the account of his researches on the manner of their development. He finds a strong "organic similarity" between the auxiliary-cell of the fertilized carpogonium and the tetrasporangium mother-cell. In the one case the sporogenous energid penetrates into the auxiliary-cell, and, although no nuclear fusion takes place, the carpospores arise as the result of this penetration. In the case of the tetrasporangium of *Polysiphonia variegata* Zan., two cells are given off from a pericentral cell, the lower one being designated by Heydrich the stalk-cell (Stützzelle), or karyoplastic cell, and the upper one the protospore cell. The karyoplastic cell puts forth a small tube towards the upper (protospore-) cell, and as soon as a connection is established between these cells the nucleus of the karyoplastic cell divides into two. The upper of these two nuclei passes at once into the protospore cell, whereupon the true nucleus of that cell retires upwards and eventually perishes. The protospore-cell now becomes the tetrasporangium mother-cell. The analogy between the two processes is obvious. The author finds that much the same method of development occurs in *Fauchea repens* Mont., *Ceramothamnion*, *Callithamnion*, *Hypnea*, *Dudresnaya*, and others. Figures of the various stages are given.

The fifth part of Mr. F. M. Bailey's *Queensland Flora* carries on the enumeration from *Loranthaceæ* to *Lemnaceæ*: it includes roughly-executed but useful illustrations of a few of the more interesting plants described. The work is paged continuously throughout, and so far consists of 1700 pages; this seems to us an inconvenient number, although reference is made easy by a good index to each part.

The last part of the Linnean Society's Transactions is devoted to "A Contribution to the Freshwater Algæ of Ceylon," by Messrs. W. & G. S. West. It is illustrated by six plates, and is printed in the handsome but extravagant manner which characterizes the Transactions. The dates given are somewhat confusing: the introduction is dated "December, 1900"; the paper was read 20 June, 1901; the date of publication on the cover is March, 1902, but it was not distributed to members until late in July.

Nature Notes for July prints the address which Lord Avebury delivered to the Selborne Society at its Annual Meeting on May 29. His lordship gave examples of the various "explanations for the colour, form, and structure" of certain flowers, and dealt with other phenomena—such as "mimicry," the shape of plants, &c. He tells us that "farmers' boys in some parts are said to regulate their

dinner-time by" the closing of *Tragopogon pratensis*, but as this only opens in bright weather, one wonders what they do on wet days. *Lamium album* "frequents waste ground and roadsides, and seems to love the stinging nettle. The leaves and general habit are so similar that from a little distance it is almost impossible to distinguish them unless the deadnettle is in flower"; and Lord Avebury "can hardly doubt that the deadnettle is often spared [from whom or what?] from its similarity to the stinging nettle." Our own experience is that the plants seldom grow together, and, even if the resemblance be as striking as his lordship seems to think, it can only be for a very brief period, as *Urtica* rapidly grows to a height which the *Lamium* never attains. *Stipa pennata* is mentioned as "a rare British grass," but, although reported as British in the eighteenth century, we are not aware that the rumour has ever been confirmed.

Sir John Goldney talked about the sensitive plant, "which had always appeared most remarkable to him. His idea always had been that it had the power of withering up when touched, so that a horse or cow, if desirous of eating it, would pass it by as being a dead plant." One would have thought that horses and cows were tolerably accustomed to "dead plants" in the form of hay, to which they manifest no rooted objection. We would suggest to the Editor of *Nature Notes* the advisability of adding to the examples already published the admirable illustration given by Mr. H. G. Wells in his essay on "the Amateur Nature-lover," which runs as follows:—"Rising, the amateur nature-lover finds he has been reclining on a puff-ball. These puff-balls are certainly the most remarkable example of adaptation to circumstances known to English botanists. They grow abundantly on golf grounds, and are exactly like golf-balls in external appearance. They are, however, Pharisees and whited sepulchres, and within they are full of a soft mess of a most unpleasant appearance—the amateur nature-lover has some on him now—which stuff contains the spores. It is a case of what naturalists call "mimicry"—one of nature's countless adaptations. The golf-player smites these things with force, covering himself with ridicule—and spores, and so disseminating this far-sighted and ingenious fungus far and wide about the links."

Under the title *In My Vicarage Garden and Elsewhere*, Canon Ellacombe has collected into a pretty volume the essays which he has contributed to various papers. They contain much information, pleasantly conveyed, about flowers and gardens. It is to be regretted that the proofs were not more carefully read—on two facing pages (102, 103) eight names are misspelt, and the use of capitals seems to follow no rule; this criticism applies throughout the book, and not only to Latin plant-names; on p. 106, in one paragraph, we have (twice) "Banhin" for Bauhin, and "*Pinex*" for *Pinax*. The essays should also have been brought up to date—*e. g.* it is rather belated to state objections to the earlier opening of Kew Gardens, seeing that that reasonable arrangement was inaugurated in 1898.

The British Museum has lately acquired a very interesting volume containing drawings in colour of the animals and plants of Australia, made by Thomas Watling in 1788–1792. Watling was

sent out by James Lee of Hammersmith (from whose great-grandson, bearing the same names, the collection was purchased), with a view to obtaining material for a book on the natural history of the country, but Lee's death prevented his plan from being carried into effect. Apart from its contents, the volume is interesting on account of the light which it throws upon an entry on p. 253, vol. i. of Dryander's Catalogue of the Banksian Library: this runs "Volumen foliorum 70, continens figuras animalium et plantarum pictas quas in Nova Cambria prope Port Jackson delineavit Edgar Thomas Dell." In Banks's copy the last four words are struck out, and a comparison of the volume with the one acquired from Mr. Lee shows that it is the work of the same artist. Watling was acquainted with John White ("Surgeon-general to the Settlement"), who sent plants to Smith, and published in 1790 his *Journal of a Voyage to New South Wales;* one or two of Watling's drawings were executed for White. The newly acquired volume contains several views of Sydney, which are of great interest.

Another collection of early coloured drawings of Australian plants was referred to by Mr. J. H. Maiden in his presidential address recently delivered to the Linnean Society of New South Wales. These were executed by John William Lewin, A.L.S., from about 1805 to 1808 for Governor and Mrs. King. Most of the drawings are of the indigenous vegetation of Port Jackson; a few are of weeds and other introduced plants. Mr. Maiden, who speaks highly of the accuracy of the drawings, hopes to publish shortly a list with determinations. Lewin also drew Botany Bay plants for Barron Field, who was in the colony from 1816 to 1824.

The third part of Mr. F. N. Williams's *Prodromus Floræ Britannicæ*, which will include a revision of the British *Hieracia*, will be issued in the autumn. The subscribers to the earlier parts, of which only a few copies remain on hand, will of course have first claim on the new part, and the number available for casual purchasers will be but small.

In the second part of *Etudes sur la Flore du Katanga*, published last month, Dr. De Wildeman establishes four new genera of Leguminosæ—*Dewindtia*, *Droogmansia* (*Dolichos pteropus* Baker, *Meibomia Stuhlmanni* Hiern, and *M. megalantha* Hiern), *Vignopsis*, and *Liebrechtsia* (*Vigna Kotschyi* Schweinf.). Numerous new species of various orders are described, and twenty-two admirable plates by A. d'Apreval are included in the part.

We learn from the *Daily News* that the recent show of the National Sweet Pea Society "was not only remarkable for its beautiful display of flowers, but it had its natural curiosity in the shape of a plant raised from seed found in the hands of an Egyptian mummy. It was known that wheat could be grown from seed corn probably taken from the granary of Joseph, but the 'mummy pea' is, we think, a novelty, an ancient novelty, if the term may be used." As we are sometimes asked where an easily accessible confutation of the venerable and popular fiction of "mummy wheat" may be found, it may be worth while to refer to a paper by Mr. Carruthers in *Nature Notes* for January, 1895.

Among the questions relating to the administration of Kew Gardens which have lately been asked in the House of Commons, was one suggesting "that the practice of labelling flowers, shrubs, and trees in Latin shall be discontinued, and English substituted; or that side by side with the Latin description [*sic*] the name shall appear in English." The absurdity of this suggestion is of course manifest to any one having the very slightest acquaintance with the facts of the case; but we are surprised to learn that, in their new edition to the *Hand-list of Herbaceous Plants*, the Kew authorities have given what are supposed to be English names. A reviewer in the *Pilot* rightly deprecates this "sop to modern faddists," and points out that the naming has been very badly done. "It is not easy to see on what principle the special names have been given; why some have been given and so many omitted. In some cases the common English name has been given to the genus, in others only to the species. Where it is given to the genus the obvious mistakes are many. Under *Brassica* is given 'cabbage' for the whole genus; under *Arum* is 'lords and ladies' for the whole genus; under *Ranunculus* is 'buttercup' for the whole; yet in these large families every *Brassica* is not a 'cabbage'; every *Arum* is not a 'lord and lady'; and every *Ranunculus* is not a 'buttercup.' Nor do we think that foreign common names should have been admitted. Such names as 'three-leaved nightshade' for *Trillium*, or 'blue cupidone' for *Catananche* have not yet obtained a footing in England, and we hope they never will."

Mr. C. Wolley Dod in the *Gardeners' Chronicle* for July 12 (which puts in a plea for the restoration of the "students' garden," lately abolished) regrets that "Kew should stamp with its authority such a name as 'Golden Knee' for *Chrysogonum*"—a name which he properly characterizes as absurd. Those who desire that Kew Gardens should be made more useful to the public should press for the production of the popular *Guide*, which, according to a statement in the House of Commons in 1891, was almost ready for publication eleven summers since, but which, we understand, has not yet appeared.

The *Annals of the Royal Botanic Gardens, Peradeniya* (vol. i. part 3) contains the first portion of the important revision of the *Podostemaceæ* of India and Ceylon by the Director, Mr. J. C. Willis. Some new species are established, and the genera *Willisia* (established by Warming in 1901) and *Farmeria* (indicated briefly by Mr. Willis in the notes appended to vol. v. of Trimen's *Flora of Ceylon*) are fully described.

A somewhat novel method of publication is to be found in the last issue of the *New Phytologist*, where Mr. A. G. Tansley in the rôle of a correspondent addresses a letter to himself as editor. The correspondent duly observes all the ordinary forms, gravely addressing himself (in his editorial capacity) as "Sir," and ending "I am, Sir, Yours, etc."

Mr. W. H. Pearson has completed the publication of his monograph of *The Hepaticæ of the British Isles*.

Fam. Myrionemaceæ Thur.

Gen. 106. Myrionema Grev.

M. strangulans Grev. *a typica* Batt. Coasts of Cornwall (St. Minver, Trevone, Mount's Bay, Falmouth, Looe); Devon (Plymouth, Torquay, Sidmouth); Dorset (Weymouth, Portland, Swanage); Hants (Isle of Wight); Sussex (Bognor, Brighton); Kent (Folkestone, Dover); Essex (Clacton); Yorks. (Filey, Scarborough, Whitby); Northumberland (Holy Island, Berwick); Cheshire (Hilbre Island); Isle of Man. Wales: Carnarvon (Bangor); Anglesea (Towyn-y-Capel, Puffin Island). Scotland: Berwicks. (Burnmouth, Eyemouth); Haddington (Dunbar, Longniddry); Edinburgh (Joppa); Fife (Elie, Kincraig, Pittenweem); Forfar (Arbroath); Kincardineshire; Aberdeen; Orkney Islands; Argyle (Loch Etive); Bute (Isles of Arran and Cumbrae). Ireland. Channel Islands (Jersey, Alderney, Guernsey). Common everywhere along the coasts of the British Islands. — *β punctiforme* Holm. & Batt. (= *M. punctiforme* Harv. et *M. intermedium* Foslie). Coasts of Cornwall (Trevone, Falmouth, Looe); Devon (Torbay); Yorks. (Scarborough, Filey); Durham (Seaham Harbour); Northumberland (Berwick); Cheshire (Hilbre Island). Scotland: Haddington (Dunbar); Forfar (Arbroath); Orkney Islands (Skaill, Ronsay); Argyle (Appin, Loch Etive). Ireland. Channel Islands (Jersey, Guernsey, Alderney). Not uncommon.

M. polycladum Sauv. Coast of Dorset (Swanage). Probably not uncommon.

M. Corunna Sauv. (= *Ascocyclus fœcundus* var. *seriatus* et *A. balticus* Batt. in Journ. Bot. 1892, p. 174). Coasts of Dorset (Durlston Head, Swanage); Cheshire (Hilbre Island). Scotland: Bute (Isles of Bute, Cumbrae, and Arran). Not uncommon.

M. papillosum Sauv. Coast of Dorset (Weymouth, Swanage). Not uncommon.

M. æcidioides Sauv. (= *Ectocarpus æcidioides* Rosenv.). Coasts of Cornwall (Falmouth); Devon (Seaton); Yorks. (Filey); Northumberland (Berwick). Scotland: Bute (Isle of Cumbrae). Not uncommon.

M.? saxicola Kuck. Coast of Dorset (Swanage). Rare.

Gen. 107. Ulonema Foslie.

U. rhizophorum Foslie. Coasts of Cornwall (Falmouth); Devon (Sidmouth); Yorks. (Filey); Northumberland (Berwick). Ireland: Roundstone, Co. Galway. Not uncommon.

Gen. 108. Hecatonema Sauv.

H. maculans Sauv. Coasts of Devon (Sidmouth) and Dorset (Swanage). Rare.

H. globosum Batt. (= *Ascocyclus globosus* Rke.). Coast of Bute (Isle of Cumbrae). Very rare.

H. reptans Sauv. (= *Ascocyclus reptans* Rke.). Coasts of Dorset (Swanage); Sussex (Bognor); Northumberland (Berwick). Scotland: Bute (Isle of Cumbrae). Rare.

H. Liechtensternii Batt. (= *Myrionema Liechtensternii* Hauck). Coast of Northumberland (Berwick). Very rare.

Gen. 109. Chilionema Sauv.

C. Nathaliæ Sauv. (= *Myrionema Leclancherii* Harv. pro parte). Coasts of Devon (Torquay, Sidmouth) and Dorset (Swanage). Rare.

C. reptans Sauv. (= *Ectocarpus reptans* Crn.). Coasts of Dorset (Swanage, Durlston Head), Suffolk (Felixstowe), Northumberland (Berwick), and Anglesea (Puffin Island). Very rare.

C. ocellatum Sauv. (= *Ascocyclus ocellatus* Rke.) Coasts of Devon (Sidmouth), Dorset (Swanage), and Northumberland (Berwick). Channel Islands (Alderney). Rare.

Gen. 110. Ascocyclus Magn.

A. orbicularis Magn. Coasts of Cornwall (Scilly Islands); Dorset (Swanage); Sussex (Bognor). Scotland: Bute (Isles of Arran and Cumbrae); Ayr (Portincross). Ireland: Galway. Channel Islands (Jersey, Alderney). Not uncommon on the leaves of *Zostera*.

A. hispanicus Sauv. Coasts of Devon (Sidmouth) and Dorset (Swanage). On the fronds of *Saccorhiza polyschides* and *Laminaria saccharina*. Rare.

A. sphærophorus Sauv. Coasts of Cornwall (Scilly Islands); Devon (Sidmouth); Dorset (Swanage). Channel Islands (Jersey). Locally abundant.

Gen. 111. Ralfsia Berk.

Subgenus 1. Stragularia (Strömf.).

R. spongiocarpa Batt. (= *R. clavata* Rke., non Farlow). Coasts of Devon (Plymouth, Wembury), Dorset (Swanage), Sussex (Bognor), and Northumberland (Berwick). Rare.

R. clavata Farlow (= *Myrionema clavatum* Harv., *Ralfsia clavata* Crn. (pro parte), *R. Borneti* Kuck., et *Stragularia adhærens* Strömf.). Coasts of Cornwall (Penzance, Falmouth, Fowey); Devon (Torquay); Dorset (Chapman's Pool); Essex (Estuary of the Orwell and Stour); Northumberland (Berwick). Scotland: Argyle (Appin, Loch Goil); Bute (Isles of Arran, Bute, and Cumbrae); Ayr (Fairlie, Saltcoats). Channel Islands (Guernsey, Alderney). Locally abundant.

R. pusilla Batt. (= *Stragularia pusilla* Strömf.). Coasts of Dorset (Swanage) and Northumberland (Berwick). Scotland: Bute (Isle of Cumbrae). Very rare.

R. disciformis Crn. Coast of Devon (Plymouth, Wembury). Very rare.

Subgenus 2. Euralfsia.

R. verrucosa Aresch. Coasts of Cornwall (St. Minver, Trevone, Mount's Bay, Falmouth, Fowey); Devon (Plymouth, Torquay, Exmouth, Sidmouth); Dorset (Chapman's Pool); Hants (Isle of Wight); Sussex (Bognor); Yorks. (Filey, Whitby); Northumberland (Hartley, Berwick); Cheshire (Hilbre Island). Wales: Anglesea (Puffin Island); Carnarvon (Llanfair-is-gaer). Scotland: Berwicks. (Burnmouth); Haddington (Dunbar); Edinburgh (Joppa);

Fife (Kincraig, Elie, Earlsferry); Kincardine (Girdleness, Stonehaven); Aberdeen; Orkney Islands; Argyle (Appin, Dunstaffnage, Loch Goil); Bute (Isles of Arran and Cumbrae); Ayr (Ardrossan); Renfrew (Wemyss Bay). Ireland: Miltown Malbay and Kilkee, Co. Clare; Roundstone Bay, Co. Galway, &c. Channel Islands (Jersey, Guernsey, Alderney). Common.

Gen. 112. Lithoderma Aresch.

L. fatiscens Aresch. Coast of Devon (Bovisand, Plymouth, Wembury). Wales: Carnarvon (Llanfair-is-gaer). Scotland (Isle of Cumbrae).

L. simulans Batt. (= *Sorapion simulans* Kuck.). Coast of Devon (Plymouth Sound). Rare.

Fam. Chordariaceæ Rke.

Gen. 113. Spermatochnus Rke.

S. paradoxus Kütz. (= *Stilophora Lyngbyei* J. Ag.). Coasts of Cornwall (Falmouth); Dorset (Weymouth). Scotland: Orkney Islands (Kirkwall Bay); Bute (Isles of Arran and Cumbrae); Ayrshire. Ireland: Cove, Cork, and Strangford Lough). Rare.

S. Lejolisii Rke. (= *Stilophora Lejolisii* Thur.). Coasts of Cornwall (Falmouth, Looe) and Sussex (Brighton). Scotland: Bute (Isles of Arran and Cumbrae); Ayr (Fairlie).

Gen. 114. Stilophora J. Ag.

S. rhizodes J. Ag. Coasts of Cornwall (Trevone, St. Minver, Mount's Bay, Falmouth, Looe); Devon (Bovisand, Plymouth, Torquay, Sidmouth); Dorset (Portland, Weymouth, Swanage, Studland); Hants (Southampton); Sussex (Bognor, Brighton). Scotland: Orkney Islands; Argyle (Appin, Loch Etive); Bute (Isles of Arran, Bute, and Cumbrae). Ireland: Bantry Bay, Co. Cork; Wicklow; Strangford and Belfast Loughs, Co. Down; Roundstone, Co. Galway; Kilkee, Co. Clare. Channel Islands (Jersey, Guernsey). Not uncommon on the shores of Southern England and South-western Scotland. Common on the eastern, southern, and western shores of Ireland.

S. tuberculosa Rke. Coasts of Dorset (Swanage) and Bute (Isle of Cumbrae). Locally abundant.

Gen. 115. Chordaria.

C. divaricata Ag. Coasts of Cornwall (Falmouth); Bute (Isle of Cumbrae); Ayr (Fairlie). Ireland: Belfast Lough, Carrickfergus. Very local.

C. flagelliformis Ag. Coasts of Cornwall (Trevone Bay, St. Minver, Penzance, Falmouth, Fowey, Looe); Devon (Plymouth, Torquay, Brixham, Dawlish, Exmouth, Sidmouth); Dorset (Portland, Weymouth, Swanage); Hants (Isle of Wight); Norfolk (Cromer, Sheringham); Yorks. (Filey, Scarborough); Northumberland (Alnmouth, Holy Island, Berwick); Cheshire (Hilbre Island, Eastham); Isle of Man. Wales: Anglesea (Towyn-y-Capel, Puffin Island). Scotland: Berwicks. (Burnmouth); Haddington (Dun-

bar); Edinburgh (Joppa); Fife (Kinghorn, Earlsferry, Elie); Forfar (Arbroath); Kincardine (Stonehaven); Elgin (Lossiemouth); Orkney Islands (Cairston, Kirkwall); Argyle (Loch Etive, Firth of Lorne, Dunoon); Bute (Isles of Arran, Bute, and Cumbrae); Dumbarton (Gare Loch). Ireland generally. Channel Islands (Jersey, Guernsey). Common.—*β firmus* Kjellm. Skerries, Co. Dublin.—*γ minor* J. Ag. Coasts of Northumberland (Berwick) and Edinburgh (Joppa).

Gen. 116. Mesogloia Ag.

M. vermiculata Le Jol. (= *M. vermicularis* Ag.). Coasts of Cornwall (Scilly Islands, Mount's Bay, Sennen Cove, Falmouth, Looe, Torpoint); Devon (Plymouth, Bovisand, Wembury, Torquay, Paignton, Exmouth, Sidmouth); Dorset (Portland, Weymouth, Swanage); Hants (Isle of Wight); Sussex (Brighton); Yorks. (Scarborough), Durham (Seaton); Northumberland (Holy Island); Cheshire (Hilbre Island); Isle of Man. Wales: Anglesea (Towyn-y-Capel, Puffin Island); Scotland: Haddington (Dunbar); Fife (Earlsferry, Kincraig, Pittenweem); Aberdeen (Peterhead); Banff (Gamrie); Elgin (Lossiemouth); Caithness (Berriedale); Orkney Islands (Skaill); Argyle (Dunstaffnage, Lismore, Dunoon); Bute (Isles of Arran aud Cumbrae); Ayr (Ardrossan). Ireland: Common on the N.E., W., and S.W. coasts. Channel Islands (Jersey, Guernsey, Alderney). Widely distributed. Abundant in some localities, especially on the N.E. shores of Scotland; less plentiful in the south.

M. Leveillei Menegh. (= *Liebmannia Leveillei* J. Ag. et *L. major* Crn.). Coast of Elgin (Covesea, near Lossiemouth). Channel Islands (Guernsey, Alderney). Rare.

M. lanosa Crn. Coasts of Dorset (Weymouth) and Bute (Isles of Arran and Cumbrae). Probably not uncommon.

M. Griffithsiana Grev. Coasts of Cornwall (Mount's Bay, Falmouth); Devon (Plymouth, Livermead, Torquay, Ladran Bay, Sidmouth); Dorset (Portland, Weymouth, Swanage); Hants (Isle of Wight); Sussex (Brighton). Scotland: Bute (Isles of Arran and Cumbrae); Ayr (Fairlie, Seamill). Ireland: Bantry Bay, Co. Cork; Roundstone Bay, Co. Galway. Locally abundant.

Gen. 117. Castagnea Derb. & Sol.

C. virescens Thur. (= *Mesogloia virescens* Carm.). Coasts of Cornwall (Scilly Islands, St. Minver, Mount's Bay, Sennen Cove, Falmouth, Looe); Devon (Plymouth, Torquay, Exmouth, Sidmouth); Sussex (Bognor, Brighton); Norfolk (Cromer); Yorks. (Scarborough); Northumberland (Cullercoats, Alnmouth, Holy Island, Bamborough, Berwick); Isle of Man. Wales: Carnarvon (Bangor); Anglesea (Llangwyfan, Towyn-y-Capel). Scotland: Haddington (Dunbar, North Berwick); Edinburgh (Inchkeith); Fife (Kincraig, Fifeness, Earlsferry, Elie); Forfar (Arbroath); Orkney Islands (Skaill); Argyle (Appin); Bute (Isles of Arran and Cumbrae); Ayr (Saltcoats, Ardrossan); Renfrew (Wemyss Bay). Ireland: Not uncommon on the S.E. and W. coasts. Channel Islands (Jersey, Guernsey, Alderney). Common and abundant.—

β gracilis (= *M. gracilis* Carm.). S.W. coast of Scotland (Appin, Isle of Cumbrae). Rare.

C. Zosteræ Thur. (= *M. virescens β zostericola* Harv.). Coasts of Cornwall (Scilly Islands, Mount's Bay); Dorset (Weymouth, Swanage). Wales: Anglesea (Towyn-y-Capel). Scotland: Argyle (Appin); Bute (Isles of Bute and Cumbrae); Ayr (Seamill). Ireland: Roundstone Bay, Co. Galway. Channel Islands (Jersey, Guernsey). Probably common.

C. contorta Thur. Coasts of Dorset (Weymouth); Sussex (Worthing); Ayr (Fairlie). Rare.

Gen. 118. Myriocladia J. Ag.

M. Loveni J. Ag. Coast of Sussex (Brighton). Very rare.
M. tomentosa Crn. Coast of Dorset (Weymouth). Very rare.

Gen. 119. Microcoryne Strömf.

M. ocellata Strömf. Coast of Dorset (Ferry Bridge, near Weymouth). Very rare.

Gen. 120. Buffhamia Batt.

B. speciosa Batt. Coast of Dorset (Ferry Bridge, near Weymouth). Very rare.

Gen. 121. Petrospongium Näg.

P. Berkeleyi Näg. (= *Leathesia Berkeleyi* Harv.). Coast of Cornwall (Trevone, St. Minver, Bossiney, Mount's Bay, Looe); Devon (Plymouth, Tor Abbey, Sidmouth); Dorset (Portland, Chapman's Pool, Durlston Head, Swanage). Wales: Anglesea (Towyn-y-Capel). Ireland: Not uncommon on the west coast (Miltown Malbay and Kilkee, Co. Clare; Valentia, Co. Kerry, &c.). Channel Islands (Guernsey, Alderney). Rare.

Gen. 122. Leathesia S. F. Gray.

L. difformis Aresch. (= *L. tuberiformis* S. F. Gray). Coasts of Cornwall (Scilly Islands, St. Minver, Padstow, Mount's Bay, Falmouth, Looe); Devon (Plymouth, Paignton, Torquay, Sidmouth); Dorset (Weymouth, Swanage); Hants (Isle of Wight); Yorks. (Scarborough, Filey); Durham (Marsden); Northumberland (Cullercoats, Alnmouth, Bamborough, Holy Island, Berwick); Cheshire (Hilbre Island); Isle of Man. Wales: Anglesea (Llangwyfan, Llanvælog). Scotland: Berwicks. (Burnmouth); Haddington (Dunbar, Longniddry); Edinburgh (Joppa); Fife (Elie, Earlsferry, Pittenweem); Forfar (Arbroath); Orkney Islands (Ryasgjo, Rinansey, &c.); Argyle (near the Falls of Lora); Bute (Isles of Arran and Cumbrae); Ayr (Seamill, Saltcoats). Ireland generally. Channel Islands (Jersey, Guernsey, Alderney). Very common.

Subgenus Corynophlœa Kütz.

L. crispa Harv. Coasts of Bute (Isle of Cumbrae) and Alderney. Very rare.

Fam. Sporochnaceæ Grev.

Gen. 123. Sporochnus Ag.

S. pedunculatus Ag. Coasts of Cornwall (Falmouth, Swanpool, Gerran's Bay); Devon (Plymouth, Sidmouth, Salcombe, Seaton); Dorset (Weymouth, Studland); Hants (Isle of Wight); Sussex (Brighton); Suffolk (Gunton, near Lowestoft; Corton); Norfolk (Yarmouth, Cromer, Runton, Sheringham); Yorks. (Bridlington, Filey); Isle of Man. Wales: Anglesea (Puffin Island); Carnarvon (Bangor). Scotland: Haddington (Preston Pans); Orkney Islands (Kirkwall); Bute (Isles of Arran and Cumbrae). Ireland (Bantry Bay, Co. Cork; Killiney and Malahide, Co. Dublin; Belfast Lough; Mouth of the River Bann, Londonderry; Roundstone Bay, Co. Galway); Channel Islands (Jersey, Guernsey). Rare.

Gen. 124. Carpomitra.

C. costata Batt. (= *Fucus costatus* Stackh. Ner. Brit. fasc. 3, p. 110, pl. xvii. (1801) e spec. orig. in Herb. Linn. Soc; *Fucus Cabreræ* Clem. Ens. p. 313 (1807); *Carpomitra Cabreræ* Kütz. Phyc. Gener. p. 343). Coasts of Cornwall (Penzance, Fowey); Devon (Plymouth). Ireland: Youghal, Co. Cork. Channel Islands (Jersey).

Fam. Chordaceæ Rke.

Gen. 125. Chorda Stackh.

C. filum Stackh. Coasts of Cornwall (St. Minver, Padstow, Penzance, Mount's Bay, Falmouth, Looe, &c.); Devon (Plymouth, Torquay, Exmouth, Sidmouth); Dorset (Portland, Weymouth, Swanage); Hants (Isle of Wight); Sussex (Bognor, Worthing, Brighton); Kent (Dover, Margate); Essex (Harwich); Norfolk (Yarmouth, Cromer); Yorks. (Scarborough, Filey); Durham (Seaton); Northumberland (Alnmouth, Bamborough, Holy Island, Berwick); Cheshire (Hilbre Island); Isle of Man. Wales: Anglesea (Towyn-y-Capel, Puffin Island); Carnarvon (Bangor). Scotland: Berwicks. (Burnmouth, Eyemouth); Haddington (Dunbar); Edinburgh (Joppa); Fife (Kinghorn, Earlsferry, Elie); Forfar (Arbroath); Orkney Islands; Argyle (Oban, Loch Etive, &c.); Bute (Isles of Arran, Cumbrae, and Bute). Ireland generally. Channel Islands (Jersey, Guernsey, Sark, Alderney). Common and abundant on the shores of the British Islands. — *β thrix* Hooker. Coasts of Cornwall (Acton Castle, Mount's Bay); Hants (Isle of Wight); Northumberland (Berwick). Probably common. — *γ subtomentosa* Aresch. Coasts of Devon (Sidmouth); Dorset, Weymouth, &c.); Hants (Isle of Wight); Northumberland (Berwick). Probably common.

C. tomentosa Lyngb. (= *C. filum β tomentosa* Harv,). Coasts of Cornwall (Boscastle); Devon (Ilfracombe, Torquay); Yorks. (Filey, Whitby); Northumberland (Berwick). Scotland: Fife (Earlsferry, Elie); Aberdeen (Peterhead); Orkney Islands (Kirkwall, Skaill); Bute (Isle of Cumbrae); Ayr (Saltcoats). Ireland: Coasts of Antrim and Galway. Rather rare. — *β subfulva* Foslie. Coast of Bute (Isle of Cumbrae). Rare.

Fam. Laminariaceæ Thur.

Gen. 126. Laminaria Lamour.

L. saccharina Lamour. Coasts of Cornwall (Penzance, Falmouth, Fowey, &c.); Devon (Plymouth, Torquay, Sidmouth, &c.); Dorset (Portland, Weymouth, Swanage); Hants (Isle of Wight); Sussex (Bognor, Brighton, Worthing); Kent (Dover, Deal); Essex (Clacton); Suffolk (Felixstowe); Norfolk (Yarmouth, Cromer); Durham (Sunderland, Whitby, &c.); Northumberland (Cullercoats, Alnmouth, Bamborough, Holy Island, Berwick); Isle of Man. Wales: Anglesea (Llanvælog, Puffin Island); Carnarvon (Bangor); Scotland: Berwicks. (Burnmouth, Eyemouth); Haddington (Dunbar, Longniddry); Edinburgh (Joppa); Fife (Elie, Earlsferry); Forfar (Arbroath); Kincardine (Stonehaven); Aberdeen; Elgin (Lossiemouth); Orkney Islands; Argyle (Oban, Inellan); Bute (Isles of Arran, Cumbrae, and Bute); Dumbarton (Gare Loch). Ireland: Common everywhere. Channel Islands (Jersey, Guernsey, Alderney). Very common and abundant everywhere on the shores of the British Islands. — Var. *caperata* Farlow. Shores of the Isle of Bute.—Var. *latissima* (Turn.) (= *L. latifolia* Ag.). Coasts of Norfolk (Yarmouth), Bute, and Firth of Forth. Rare. — Var. *Phyllitis* Le Jol. (= *L. Phyllitis* Lamour.). Coasts of Cornwall (St. Minver, Looe); Devon (Torbay, Sidmouth); Dorset (Portland, Weymouth); Hants (Isle of Wight); Sussex (Brighton, Eastbourne); Norfolk (Yarmouth); Yorks. (Filey, Whitby); Durham (Sunderland); Northumberland (Alnmouth, Holy Island, Berwick). Wales: Pembroke (Tenby). Scotland: Haddington (Dunbar); Edinburgh (Joppa); Fife (Kinghorn, Elie, Earlsferry); Forfar Arbroath); Kincardine (Cove); Aberdeen (Peterhead); Banff (Macduff); Orkney Islands (Kirkwall); Argyle (Falls of Lora); Bute (Isles of Arran and Cumbrae); Dumbarton (Helensburgh); Ayr (Ardrossan). Ireland: Bantry Bay, Co. Cork; Larne, near Belfast; Kingstown, Howth, and Balbriggan, Co. Dublin; Inishbofin Island, Co. Galway. Not uncommon. — Var. *linearis* J. Ag. Coasts of Hants (Isle of Wight, Portsea) and Essex (Clacton). Rather rare.

L. hieroglyphica J. Ag. (= *L. saccharina* var. *bullata* Auct. pro parte). Coasts of Northumberland (Berwick); Haddington (Dunbar, Longniddry); Fife (Elie); Forfar (Arbroath); Aberdeen (Peterhead); Elgin (Lossiemouth); Caithness (Berriedale); Orkney Islands. Common on the north-east coast of Scotland.

L. digitata Lamour. *α typica* Foslie. Coasts of Cornwall (St. Minver, Trevone, Penzance, Falmouth, Fowey, Looe); Devon (Plymouth, Torquay, Sidmouth); Dorset (Portland, Weymouth, Swanage); Hants (Isle of Wight); Sussex (Brighton, Hastings); Kent (Folkestone); Northumberland (Cullercoats, Alnmouth, Bamborough, Holy Island, Berwick); Cheshire (Hilbre Island); Isle of Man. Wales: Anglesea (Puffin Island); Carnarvon (Swillies). Scotland: Haddington (Dunbar); Edinburgh (Joppa); Fife (Elie, Earlsferry); Forfar (Arbroath); Orkney Islands (Kirkwall); Argyle (Oban); Bute (Isles of Arran, Cumbrae, and Bute); Ayr (Portin-

cross, Ardrossan). North and west of Ireland. Channel Islands (Jersey, Guernsey, Alderney). Common. — β *stenophylla* Harv. Coasts of Yorks. (Scarborough, Filey); Northumberland (Holy Island, Berwick). Scotland: Berwicks. (Burnmouth); Forfar (Arbroath); Kincardine (Bay of Nigg); Orkney Islands; Ayr (Ardrossan). Ireland: Coast of Antrim. Rather rare, and confined to the northern shores of the British Islands. — γ *ensifolia* J. Ag. (= *L. ensifolia* Kütz.). Coasts of Northumberland (Holy Island, Berwick), Haddington (Dunbar), and Edinburgh (Joppa). Rare. — δ *valida* Foslie. Coast of Northumberland (Berwick). Probably not uncommon.

L. Cloustoni Edm. (= *L. hyperborea* Foslie; *L. digitata* Phyc. Br. pro parte). Coasts of Cornwall (Falmouth); Devon (Torquay, Sidmouth); Dorset (Weymouth); Hants (Isle of Wight); Yorks. (Scarborough, Filey); Durham (Seaton, Sunderland, &c.); Northumberland (Cullercoats, Alnmouth, Bamborough, Holy Island, Berwick); Cheshire (Hilbre Island); Isle of Man. Wales: Anglesea (Towyn-y-Capel, Puffin Island). Scotland: Berwicks. (Burnmouth, Eyemouth); Haddington (Dunbar); Edinburgh (Joppa); Fife (Kinghorn, Kirkcaldy, Elie, Earlsferry); Forfar (Arbroath); Kincardine (Stonehaven, Girdleness); Aberdeen (Peterhead); Elgin (Lossiemouth); Orkney Islands (Kirkwall); Argyle (Oban); Bute (Isle of Cumbrae). Ireland: Coasts of Antrim, Galway, and Cork. Channel Islands? Not uncommon.

Gen. 127. Saccorhiza De la Pyl.

S. polyschides Batt. (= *Fucus polyschides* Lightfoot, Flor. Scotica, p. 936 (1777); *F. bulbosus* Huds. Flor. Angl. ed. 2, p. 579 (1778); *Laminaria bulbosa* Lamour.; *Saccorhiza bulbosa* De la Pyl.). Coasts of Cornwall (Penzance, Falmouth, Fowey, Looe, Cawsand); Devon (Plymouth, Torquay, Sidmouth); Dorset (Portland, Weymouth. Swanage); Hants (Isle of Wight); Kent (Dover); Yorks. (Scarborough); Northumberland (Holy Island, Berwick); Isle of Man. Wales: Anglesea (Towyn-y-Capel). Scotland: Haddington (Dunbar); Fife (Inchcolm, Elie); Elgin (Lossiemouth); Orkney Islands; Argyle (Loch Fyne, Mull of Kintyre); Bute (Isles of Arran and Cumbrae); Ayr (Ardrossan). Ireland: Bantry Bay, Co. Cork; Larne, Co. Antrim. Channel Islands (Jersey, Guernsey, Alderney, Sark). Not uncommon.

Gen. 128. Alaria Grev.

A. esculenta Grev. Coasts of Cornwall (Trevone Bay, St. Minver, Lizard, Mousehole, Kynance Cove, St. Michael's Mount, Tintagel, Sennen Cove, St. Ives, Boskenna Bay, Falmouth, Fowey, Looe); Devon (Trentishoe, &c.); Dorset (Weymouth); Hants (Isle of Wight); Norfolk (Cromer); Durham (Seaton, &c.); Northumberland (Alnmouth, Holy Island, Berwick); Cumberland; Cheshire (Hilbre Island); Isle of Man. Wales: Anglesea (Towyn-y-Capel). Scotland: Berwicks. (Burnmouth, Eyemouth); Haddington (Dunbar); Fife (Inchkeith, Seafield, Elie, Earlsferry, Fife Ness, Isle of May); Forfar (Arbroath); Kincardine (Stonehaven);

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A. Amphoranthus spinosus *S.Moore.*
B. Burmannia Dalzieli *Rendle.*

ALABASTRA DIVERSA.—Part IX.

By Spencer Le M. Moore, B.Sc., F.L.S.

(Plate 441 A.)

(Continued from p. 256.)

Amphoranthus,

Leguminosarum e subordine *Cæsalpinearum* genus novum.

Calyx supra discum brevissimum longe tubulosus limbo 4-lobo lobis petaloideis æstivatione induplicato-valvatis. Petala 0. Stamina perfecta 9, inclusa vel subinclusa, juxta basin in tubum coalita, adjecto staminodio unico parvulo omnino anantherifero; antheræ versatiles oblongæ. Ovarium stipitatum stipite a calycis tubo libero; stylus inclusus; stigma capitulatum. Ovulum solitarium, juxta loculi basin insertum, amphitropum. Legumen ?—Frutex vel suffrutex aphyllus, ramulis in spinas breves metuendas transformatis. Flores axillares, fasciculati, pedunculo perbrevi pulviniformi insidentes.

Amphoranthus spinosus, sp. unica. Ramis rigidis subteretibus cinereis glabratis, 0·2–0·3 cm. diam., floribus breviter pedicellatis, calycis extus tomentelli lobis late rotundatis obtusissimis, margine undulatis, tubo circa 0·6 cm. long, limbo 0·8 cm. diam., hujus lobis 0·5 cm. long. et 0·6 cm. lat., tubo stamineo vix 0·1 cm. long., filamentis usque ad 0·6 cm. long. et antheris 0·15 cm., ovario oblongo glabro 0·15 cm. long., ejus stipitem paullo excedente, stylo robusto 0·25 cm. long.

Hab. Damaraland; *T. G. Fen* (Herb. Mus. Brit.).

This remarkable plant seems referable to the suborder *Cæsalpineæ*, though I am not prepared to say in which tribe of that suborder it should be placed, as not one of them seems exactly suitable. It may be remarked that it shows some affinity with the *Swartzieæ*, for the flower reminds one somewhat of that of *Cordyla*; but *Amphoranthus* has a calyx certainly lobed while in the bud, and not entire in that state and splitting subsequently: with this exception, it would only be necessary for the stamens and ovules of *Cordyla* to be reduced in number and the disk greatly diminished to arrive at the structure of the new plant.

Cursory inspection of the placentation might lead to the surmise of the ovule's being basal, but by the aid of the compound microscope this is seen not to be the case. In fig. 4 two vascular bundles are shown running up the stalk of the ovary. They do not communicate, one of them running up the dorsal side of the ovary to enter the style, while the other passes into the short raphe in a way showing clearly the parietal nature of the placentation.

New Acanthaceæ from Tropical Africa.

Petalidium Gossweileri, sp. nov. Suffruticosa, caule procumbente valido sparsim ramoso glabro, ramis gracilibus foliosis glabris innovationibus simpliciter piloso-pubescentibus, foliis loranthoideis lanceolatis obtusis deorsum in petiolum quam lamina

breviorem desinentibus obscure puberulis vel glabris carnosulis, cymis paucis abbreviatis subsphæroideis densifloris, bracteis linearioblanceolatis obtusis villosulis, bracteolis ovatis valde compressis prominule reticulato-nervosis fuscis villosulis, calycis bracteolas plus quam semiæquantis utrinque pubescentis lobis anticis alte connatis, corollæ bracteas vix excedentis tubo sursum parum ampliato ibique extus pubescente, limbi lobis intus setulosis, filamentarum pars libera fere omnino glabra pars connata pilosopuberula, antheris basi breviter calcaratis.

Hab. Angola, Mossamedes, in the dry river-bed and ravines of the barren sandy hills near fazenda "Boa Vista," about 200 ft. above sea-level, Nov. 1900; *John Gossweiler*, No. 77 in Herb. Mus. Brit.

Foliorum lamina 3·0–3·5 cm. long., 1·0–1·4 cm. lat.; petioli 0·6–1·0 cm. long., microscopice puberuli. Cymæ modo 2·0 cm. long. et 1·5 cm. diam. Bracteæ (sc. ramulorum brevium florigerorum folia) circa 1·0 cm. long., ægre 0·2 cm. lat., costa media prominula. Bracteolæ paullo ultra 1·0 cm. long., dorso carinulatæ. Calycis 0·8 cm. long. lobus posticus oblongus, reliquos manifeste superans, plurinervis, 0·2 cm. lat. Corollæ rubræ tubus 1·0 cm. long., deorsum 0·1 cm. ipso sub limbo 0·3 cm. diam.; limbi 0·7 cm. diam. lobi extus minute pubescentes intus pilis paucis longis validis præditi. Antheræ 0·2 cm. long. Ovarium glabrum, circa 0·15 cm. long. Stylus circa 1·0 cm. long., deorsum pubescens. Capsula ?

Very near *P. Lepidagathis* S. Moore, but certainly distinct from it on account of the shorter and broader leaves, the villous cymes, the more compressed bracteoles, the longer calyx with its posticous lobe much broader than is that of *P. Lepidagathis*, and the shorter corolla-lobes setulose within, not glabrous.

Petalidium tomentosum, sp. nov. Suffruticosa, caule procumbente sat valido geniculato araneoso-tomentoso dein fere glabro innovationes dense foliosas pilis dendroideis necnon stellatis intermixtis densissime obsitas frequenter gignante, foliis parvis ovatis vel ovato-oblongis obtusis densissime stellato-tomentosis deorsum in petiolum ipsi laminæ tandem fere æquilongum angustatis, cymis copiosis abbreviatis oblongo-ovoideis densifloris, bracteis bracteolisque tomentosis deinde glabrescentibus illis oblanceolato-oblongis obtusis quam hæ ovatæ reticulato-nervosæ dorso carinulatæ fuscæ brevioribus, calycis utrinque pubescentis quam bracteolæ haud multo brevioris lobis anticis alte connatis, corollæ tubo bracteolis æquilongo deorsum paullulum coartato sursum pubescente, filamentis puberulis, antheris basi breviter calcaratis.

Hab. Angola, Mossamedes; *John Gossweiler* (Herb. Mus. Brit.).

Foliorum lamina 1·0–1·6 cm. long., 0·7–1·2 cm. lat., carnosula, obscure nervosa; petioli tandem circa 1·0–1·2 cm. long. Cymæ 1·3–1·5 cm. long., 1·5–2·0 cm. lat. Bracteæ 0·6 cm. long., 0·2 cm. lat. Bracteolæ 0·8 cm. long. Calycis 0·65–0·7 cm. long. lobus posticus lanceolato-oblongus, 0·16 cm. lat., quam reliqui latior. Corollæ verisimiliter rubræ tubus vix 0·8 cm. long., in longitudinem eminenter nervosus; lobi extus puberuli intus glabri, circa 0·5 cm. long. Antheræ vix 0·2 cm. long. Ovarium 0·15 cm.

long. Stylus 0·8 cm. long., deorsum obscure puberulus. Capsula ovoidea, 0·5 cm. long., 0·35 cm. lat.

To be inserted in the genus next *P. halimoides* S. Moore, from which it differs in its smaller and narrower densely tomentose leaves, the branches of the at first woolly cymes with no indication of becoming spinous, its longer and narrower bracteoles with their sides more closely approximated, the smaller corollas with the tube narrowed below and not narrowed at the limb, the longer anthers, &c.

Petalidium cirrhiferum, sp. nov. Verisimiliter fruticulosa, sparsim ramosa, ramulis subteretibus vel subquadrangularibus gracilibus breviter glanduloso-pubescentibus innovationibus pilis simplicibus glandulosis brevibus dense onustis, foliis sessilibus lineari-oblanceolatis obtusis minute glanduloso-pubescentibus, floribus in axillis solitariis breviter pedunculatis, bractea 0, bracteolis ovatis cuspidato-acutis albis nervis elevatis viridibus late reticulatis percursis et pilis elongatis patentibus vitreis apice stellatis copiose munitis, calycis lobis lanceolatis (lateralibus lineari-lanceolatis) anticis fere omnino connatis, corollæ tubo bracteolas haud excedente, filamentis pilosulis, antheris subexsertis basi apiculo brevi instructis, capsula ——.

Hab. Between the Coroca and Palmfontein (Cunene-Zambesi Region); *H. Baum*, No. 14 *or* 18. (The number on the Museum label is uncertain.)

Folia 1·5–2·2 cm. long. (suprema paullo imminuta), 0·25–0·45 cm. lat., firme membranacea, obscurinervosa. Pedunculi 0·3–0·5 cm. long., arcte glanduloso-pubescentes. Bracteolæ circa 1·5 cm. long., summum 1·0 cm. lat., harum pili vitrei circa 0·5 cm. long. Calyx 1·0 cm. long.; lobi laterales 0·6 cm. reliqui 0·8 cm. long. Corollæ tubus circa 1·5 cm. long., faucibus leviter amplificatis ceteroquin stricte cylindricus; lobi 0·7 cm. long. Filamenta 0·7 cm. et antheræ 0·3 cm. long. Ovarium late ovoideum, 0·3 cm. long.; stylus puberulus 1·3 cm. long.

Distributed as "*Pseudobarleria glandulosa* (S. Moore) Lindau," to which it is undoubtedly nearest allied, but from which it can easily be distinguished by the much narrower sessile leaves, the remarkable hairs upon the bracteoles, shorter corolla-tube uniform throughout except quite at the throat, &c.

The genus *Pseudobarleria*, although accepted in Germany, has not been recognized in this country since Anderson's time; Mr. Clarke (Flora Trop. Afr. v. p. 93) well states the reasons for its inclusion in *Petalidium*. See also Prof. Schinz in Mém. Herb. Boiss. No. 20 (1900), p. 33.

Barleria buddleioides, sp. nov. Fruticosa vel fruticulosa, caule subtetragono sparsim ramoso arcte et minute fulvo-stellato-tomentoso, foliis subsessilibus oblanceolatis obtusis obscure undulatis subcoriaceis supra glabris nitidulis laxe reticulato-nervosis subtus brevissime albido-stellato-tomentosis, floribus magnis in spicas breves subsphæroideas vel subsphæroideo-cylindricas pauciforas digestis, bracteis arcte imbricatis late ovatis obtusissimis

eminenter reticulato-nervosis pubescentibus mox glabrescentibus subpapyraceis, calycis pubescentis bracteas excedentis sepalo postico late oblongo obtuso sepalis anticis alte connatis lateralia lanceolata acuminata bene superantibus, corollæ tubo calycem excedente attenuato utrobique sed præsertim basi amplificato lobis obovatis quam tubum brevioribus, ovario glabro, stylo pilis pulvinulatis brevissimis onusto.

Hab. South-west Africa, between Kassinga and the Kubango, at 1400 metres; *H. Baum*, No. 238.

Folia circa 7·0 cm. long. (summa vero breviora) et 1·7–2·0 cm. lat.; petioli 0·3–0·4 cm. long. Spicæ circa 2·0 cm. long., summum fere usque ad 3·0 cm. diam. Bracteæ 1·5–2·0 cm. long., circa 1·0 cm. lat. Sepala majora 2·2 cm. et minora 1·5 cm. long. Corollæ tubus circa 3·0 cm. long.; limbus pansus 3·5 cm. diam.; lobi circa 2·0 cm. long. Ovarium oblongum, 0·6 cm. long. Capsula ——.

Distributed as "*Barleria salicifolia* S. Moore," but certainly different from it in shape of leaf, broad very obtuse bracts, much larger flowers, &c. It seems nearer the plant called by me *B. stellato-tomentosa*, but here again there are differences in respect of the bracts and the flowers which prevent one regarding the two as conspecific.

Justicia (§ Calophanoides) **linarioides**, sp. nov. Suffruticosa, erecta, ramosa, breviter molliterque pubescens, ramulis subteretibus gracilibus, foliis parvis distantibus sessilibus oblongo-linearibus obtusis, pedunculis axillaribus ascendentibus folia longe excedentibus 1–2-floris, bracteolis flori approximatis lanceolatis quam calyx paullo brevioribus, calycis lobis anguste lineari-lanceolatis acutis pubescentibus corollæ tubo brevioribus, corollæ parvæ tubo subcylindrico extus pubescente limbi labio postico late ovato breviter bilobo tubo subæquilongo, labio antico quam posticum paullo breviore alte fisso, lobo intermedio quam laterales manifeste latiore, antherarum loculis subæqualibus loc. sup. basi obtuse mucronato, loc. inf. calcari quam se ipsum breviore parum curvato onusto.

Hab. South-west Africa, on the Chitanda beneath Goudkopje; *H. Baum*, No. 166.

Folia 0·5–0·8 cm. long., circa 0·15 cm. lat. Bracteolæ 0·3 cm. long. Calycis lobi 0·4 cm. long. Corollæ tubus 0·6 cm. long., circa 0·25 cm. diam., limbus circa 0·6 cm. diam.; labium posticum 0·6 cm. long., 0·4 cm. lat., concavum, hujus lobi vix 0·1 cm. long.; labii antici 0·5 cm. long. lobus intermedius ovatus, 0·35 cm. long., laterales oblongi, omnes obtusissimi. Antherarum loc. inf. 0·15 cm. necnon hujus calcar 0·1 cm. long. Discus breviter lobulatus, 0·1 cm. alt. Ovarium ovoideum, sursum breviter pilosum, 0·15 cm. long. Stylus fere 1·0 cm. long., deorsum pilosulus. Ovula quove in loculo 2. Capsula ——.

Distributed as "*Duvernoia brevicaulis* (S. Moore) Lindau," i. e. *Justicia brevicaulis* S. Moore, to which it is undoubtedly near. The leaves, however, are quite different, the flowers somewhat smaller, the lateral lobes of the lower lip of the corolla are much narrower than the central lobe, the lobes of the upper lip are markedly shorter, &c.

The habit would appear to be that of *J. brevicaulis*, but the state

of the two small specimens seen scarcely warrants affirmation upon this point.

Note on Hæmacanthus.

In the *Journal of Botany*, 1899, p. 63, I described under the name of *Hæmacanthus coccineus* the remarkable plant subsequently figured on tab. 402 of the above volume. The points on which I relied as distinguishing this new genus from *Satanocrater* Schweinf., its closest ally, were the tubular (not ventricose) calyx, the quite differently shaped corolla as regards both tube and limb, and the far-exserted stamens and style. Recently Dr. Lindau (Engler & Prantl, *Nat. Pflanzenfam. Nachtr.* 1900, p. 71) has referred this plant to *Satanocrater*, and the reading of the description given by this author of his *Ruellia somalensis* (*Bot. Jahrb.* xx. p. 14), which later became *Satanocrater somalensis* Lindau, creates the suspicion that *S. somalensis* and *Hæmacanthus coccineus* may be one and the same thing, although there are certain discrepancies in the two descriptions.* This is a point which Lindau will himself be able to clear up, as he has access to *S. somalensis*, and can compare that plant with the figure of the other. What I wish to do here is to defend myself against the appearance of having neglected literature. As a fact, I saw the description of the alleged *Ruellia*, but immediately passed it over, as I did not think it possible for anyone, least of all for so accomplished a botanist as Lindau, to take for a *Ruellia* the plant I was dealing with. Perhaps this hesitation of Lindau's between *Ruellia* and *Satanocrater*, two absolutely different although neighbouring genera, may be taken as affording fair proof of my judgment not being at fault in proposing a new genus for the reception of the plant under notice. Anyway, I do not feel inclined to recede from my position, and regret that we should be at variance.

What *S. paradoxa* Lindau and *S. Ruspolii* Lindau are I do not know. Mr. C. B. Clarke (*Fl. Trop. Afr.* v. p. 69) says the latter is only the old *S. fellatensis* Schweinf., and he makes *S. paradoxa* a synonym of *S. somalensis*, which I cannot help thinking to be incorrect.

I may add that in Just's *Bot. Jahresb.* 1901, p. 516, Professor Karl Schumann appends this note *à propos* of *Hæmacanthus*: "Besser wäre Hæmatacanthus." But why? Surely there is crowned warrant for my word, e. g. *Hæmanthus*, *Hæmadictyon*, *Hæmodorum*, &c., and, even were there not, it might perhaps be conceded that a barbarism in four syllables has some slight advantage over one in five. Moreover, this does not warrant Schumann's crediting *Hæmatacanthus* to me as he does (*l. c.*)—at least I presume he means me, though he gives "P. Moore" as the authority for the name. This "P. Moore" is one of no less than seven designations with which I have been honoured at various times by botanists, and I shall take it as a favour if they will kindly remember in future that I have always called myself "S. Moore," and wish to be known as such, and as such alone.

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* The leaves of *H. coccineus* are said to be "2·5–4·0 cm. lat." This is obviously a *lapsus calami* for 0·25–0·4 cm.

EXPLANATION OF PLATE 441 A.

Amphoranthus spinosus S. Moore.—Sketch of plant, nat. size. 1. A flower. 2. Longitudinal section of same, showing five of the stamens and the staminode. 3. An empty anther. 4. Ovary opened, viewed under compound microscope low power, showing the parietal and the ovular vascular bundle. The ovule is clearly seen to be parietal, and not basal.

NEW CHINESE PLANTS.

By A. B. Rendle, M.A., D.Sc.

(Plate 441 B.)

The following plants occurred in a small collection recently received at the Museum from Mr. John M. Dalziel, M.B. As regards the two Orchids, Mr. Rolfe kindly informs me that they are not included in the list of Chinese Orchids which he has prepared.

Calanthe Masuca Lindl. var. sinensis, var. nov. Planta quam in specie minus robusta, pedunculo graciliore, racemo paucifloro, lobis labelli lateralibus brevibus obtusis.

Leaves glabrous on upper, subglabrous on lower surface; including the petiole and sheathing base 22–30 cm. long. Peduncle bearing the few-flowered laxly spreading raceme above the leaves. Bracts acute, 12 mm. long. Pedicel and ovary 3 cm. long; flowers "a handsome purple, 4 cm. across." Sepals 2–3 cm. long, petals slightly shorter; lip 12 mm. long; mid-lobe emarginate, 1 cm. long and as broad, lateral lobes less than 4 mm. long; disc bearing two rows of verrucose calli converging on the narrow base of the mid-lobe. Spur 3 cm. long, broadening below the middle to about 3 mm. in diameter.

Hab. Wet places in woods; 2000 ft. September.

The reduction in the size of the lateral lobes of the lip is a striking character of this variety; but, bearing in mind the variation in the form and relative size of the lip-lobes in this and other species of the genus, I do not think the peculiarity, although associated with a less robust habit of the plant, sufficient to authorize the making of a new species.

Calanthe Masuca has hitherto been recorded only from the mountains of Northern and Southern India and Java.

Hetæria cristata Bl. var. minor, var. nov. Herba 20 cm. alta, foliis ad 8 cm. longis et 2 cm. latis, spicis 8–12-floris ad 5 cm. longis.

Except for its much smaller dimensions (less than half the size), the plant agrees with Blume's figure and description (Orchid. Archip. Ind. p. 130, t. 33). The flowers are only slightly smaller than in the type; the dorsal sepal is 3·5 mm., the lateral 4 mm., and the lip when opened 3 mm. long by 2 mm. broad. Blume's plant is a native of the mountains of Java, and the occurrence of a form so closely allied in Southern China is of special interest from the fact that the genus has not hitherto been recorded from China.

Hab. In damp woods, along with *Hæmaria discolor*; 2000 ft. August and September.

Burmannia Dalzieli, sp. nov. Herba parva parasitica, caule, e tubere subcylindrico, radices fibrillosas emittente, oriundo, erecto, gracili, squamulis anguste-lanceolatis acuminatis; floribus paucis ad apicem caulis aggregatis, breviter pedicellatis, ascendentibus; perianthio tubuloso, angulato, lobis tribus exterioribus late oblongis, marginibus inflexis, interioribus duplo minoribus, obovato-spathulatis, superne papillosis; antheris 3, sessilibus, diametro transversali quam verticali 1½ majore, connectivo brevi obtuso; stylo cylindrico, brachiis tribus clavatis, stigmatibus concavis; ovario triloculare, seminibus inappendiculatis, ovatis, nigrescentibus, testa reticulata.

Plants colourless, 6–8 cm. long; tuber 7 mm. long by barely 2 mm. in diameter. Scale-leaves on stem hyaline, 5 mm. long, except the few lowest, which are shorter. Bracts triangular-ovate to lanceolate, 3·5–5·5 mm. long, flowers 2–7 in the head. Perianth 4–5 mm. long, outer lobes 1 mm., inner ·5 mm. long, and "of faint pink-brown colour." Anthers barely ·5 mm. long by ·75 mm. broad, not appendaged. Style 2·75 mm. long, ending in three short branches (1 mm. long), which rapidly broaden upwards to the stigmatic pocket.

Hab. In damp woods; parasitic on roots. July, 1901.

Near the Malayan *Burmannia tuberosa* Beccari, which it closely resembles in size and habit, but is distinguished by the form of the anther and stigmas.

Mr. Dalziel states that *Burmannia disticha* was common; and *B. Wallichii* was found once only.

Description of Plate 441 B.

Burmannia Dalzieli, whole plant, nat. size.—Fig. 1. Flower with perianth cut open. 2. Anther dehiscing. 3. Stigma. 4. Seed.

WELSH HIERACIA.

By H. J. Riddelsdell.

The following records of Hawkweeds for three counties—Glamorgan, Brecon, and Caermarthen (v.-c. 41, 42, 44)—may be of interest. They are made on the authority of Mr. Ley's identifications, and are supplemented by one or two in other vice-counties.

Hieracium saxifragum b. *orimeles* F. J. H. Caermarthenshire Fan (v.-c. 44).

H. stenolepis (Lindeb.). Craig Cil-le (42).

H. hypochæroides var. *saxorum* F. J. H. Caermarthenshire Fan (44).—Var. *cyathis*. Craig Cil-le (42).

H. britannicum F. J. H. Craig Cil-le (42).

H. rivale F. J. H. Caermarthenshire Fan (44).

H. murorum var. *pellucidum* Laestad. is common near Aberdare

in both 41 and 42. I have it also from Symonds Yat and Stroud (34), and Craig Cil-le (42). — Var. *sanguineum*, from Bolton Abbey (64), in 1894. — Var. *crebridens* Dahlst. from the Caermarthenshire Fan (44).

H. euprepes, nov. var., from the same spot.

H. vulgatum, type, from the R. Hepste (42). — Var. *ravusculum* Dahlst., "or near it," from Bolton Abbey (64), in 1894. — Var. *dædalolepium* Dahlst. is the commonest hawkweed near here in both 41 and 42; also Swansea (41). — Var. *glaucovirens* Dahlst., from near Aberdare (41) and Penderyn (42).—Var. *amphibolum* Lindeb., from Callwen and Hepste River (42), and from Aberdare (41).—Var. *mutabile* Ley, from Callwen and R. Hepste and Craig Cil-le (42); from Llwydcoed (41); Lampeter (46); the Caermarthenshire Fan (44); Bangor (49).—Var. *amplifolium* Ley. A very handsome plant; common about Aberdare (41); also Nant Hir (42).

H. diaphanoides. Several places near Aberdare (41).

H. sciaphilum. Common in 41 and 42, near Aberdare; Llanelly (42); Stroud (34); Clapham Woods (64), in 1895. — Var. *pulchrius* Ley. Caermarthenshire Fan (44).

H. rigidum var. *pullatum* Dahlst. Aberdare (41). — Var. *scabrescens* Johanns. Llwydcoed (41); Callwen (42). — Var. *nidense* F. J. H. Callwen (42).—Var. *serpentinum* F. J. H. Aberdare (41) and Caermarthenshire Fan (44).—Var. *calcaricolum* F. J. H. Callwen (42).—Var. *strigosum*. Callwen (42) and the Caermarthenshire Fan (44).

H. cantianum F. J. H. In quantity at Llwydcoed; also other spots near Aberdare (all 41). I have it down for 42, but fear a mixture of labels, and must wait to confirm the record.

H. strictum var. *opsianthum* Dahlst. ("probably"). Aberdare (41).

H. corymbosum, "near type." Callwen (42).

All these date (exceptions are noted) from the last year or two. I cannot say which are new records. Some forms I have distributed through the B. E. C.; others I hope to distribute.

The character of the country in this valley is peculiar. The geological foundation is the coal-measures; we are near the outcrop, and so on the borders of a narrow band of millstone grit, and another narrow band of limestone (*e.g.* as at Cil-le, the River Hepste), which brings us immediately to the sandstone of the Brecon Beacons and the Caermarthenshire and Breconshire Fans. The Aberdare Valley lies wholly in the coal-measures, which themselves produce no flora worthy of mention, except *Vicia Orobus*. But the whole district is veined with railways (mineral and other), and pitted with refuse-heaps of coal-pits and iron-works; and the valuable Hieracia grow almost exclusively on these products of human industry. Except in the hawkweed season, the tips are an eyesore and an ugliness; but just now (5 July) they are a mass of yellow blossom, chiefly hawkweed, but also *Anthyllis* and *Lotus*; and a nearer examination shows masses of beautiful *Vicia angustifolia*, and later on we have very good Rubi.

SALIENT CHARACTERS IN *HIERACIUM*.

By Frederic N. Williams, F.L.S.

In one of his occasional addresses, the late Premier remarked that he was afraid that the department of which he was the responsible head "had put their money on the wrong horse." Perhaps the same simile may apply to those who, in studying critical genera among British plants, have depended entirely on the views of Scandinavian botanists and on their sets of *exsiccatæ* in the elucidation of British Hawkweeds. For certain it is that those who have worked at the *Hieracium*-forms of Central Europe by no means agree with their Scandinavian *confrères*, either in the value they assign to salient characters for the separation of sections and species, or in the relevance of the characters themselves. The results of investigations into the experimental crossing of *Hieracium*-forms, only recently brought into notice, have shown that the dominant and recessive characters, which obtain in the hybrids so produced, throw much light on the value of group-characters and their constancy in allied forms. Whatever forms are selected for crossing, certain characters remain dominant in the offspring, and certain others appear recessive and tend to disappear.

Before attempting a revision of the *Hieracia* found in these islands, it will be necessary to compare many series of specimens with those found in the mountains and uplands of Central Europe, so many of which have been issued in sets by Naegeli and Peter, Arvet-Touvet, Uechtritz, and others, and critically studied by Celakovsky, Burnat and Gremli, Hervier, A. Scheele, Sendtner, Oborny, and Hermann Zahn, and not to rely altogether on comparison with the sets of specimens issued by Lindeberg, J. P. Norrlin, Hugo Dahlstedt, and the earlier ones of Fries. These remarks are intended to convey that when a doubtful hawkweed, whether from letch or from corrie, is sent to a Scandinavian hieraciologist for examination, and is returned marked "not known in Scandinavia," or "a nostris diversum," it is not then and there to be dubbed endemic before attempting to match it with Central European forms of the same group.

In the first place, some misconceptions rooted in the minds of those who have described British Hawkweeds have to be explained. In the last edition of his *Manual*, p. 216, Babington defines a "seta" as a gland-tipped hair. It is nothing of the sort, and nothing could make it so. As rightly defined by Bischoff, Asa Gray, and by Mr. B. D. Jackson in his *Glossary*, it is, as its name implies, like a bristle, that is, a stiff hair, somewhat thickened perhaps at its place of attachment, but terminating in a point like a pin, and not surmounted with a glandular knob. It is the form of hair characteristic of the leaves of *Hieracium Pilosella*, and is also characteristic of the group of *Oreadea*, and altogether absent from the leaves of *Vulgata*, forming an essential point of difference between these groups. Hairs may be simple or compound. Ordinary hairs have a separate and distinct attachment to the surface, and

arise singly. When several hairs have a common point of attachment they are said to be stellate. On the other hand, when simple hairs are hardened and elongated they are true setæ. Glandular hairs belong to another group; and the knobbed extremity may terminate either a soft curled hair or a stiff hard one. Unfortunately, Mr. Hanbury uses the term "setose" in the erroneous sense of Babington and Backhouse, and in a sense exactly contrary to the best continental authorities. In the multiplex indumentum of *Hieracium*, the nature of the hairs characterizing different groups must be accurately observed and clearly defined, or it will vitiate in descriptions the apparent relative importance of characters. As Celakovsky, Prof. Peter, and Hermann Zahn have pointed out, these glandular hairs (or "glandulæ," as they often call them) are in some groups of *Hieracium* altogether absent, or only found on the scales of the pericline mingled with other hairs in a very small proportion, and almost concealed by them. In another group, the glandular hairs are mainly collected at the base of the pericline and on the secondary pedicels, a few on the stem, and none on the leaves. In another group they are more duly proportioned with the simple hairs on the calathocladium, and absent on the clado-phore and leaves. In another group, which among British species includes the *Alpina* section, glandular hairs are found on the leaves, even though sometimes they may be found only in small quantity. It is this ascending and divergent series of forms, in which the distribution of glands from the basal leaves to the acladium and scales can be systematically observed, which has not attracted the notice of English observers. Another character of primary importance has been entirely overlooked, namely, the structure of the alveolar depressions of the receptacle. I do not find it mentioned in any descriptions of hawkweeds in the *Journal of Botany* from 1888 to the present time. In many genera, *e.g.* those of *Lampsaneæ*, it is a primary distinguishing character. In *Hispidella* the pits of the receptacle are fimbrilliferous at the margin; in *Lampsana* and *Arnoseris* the receptacle is naked and minutely foveolate. In *Catananche* the receptacle is alveolate and fimbrilliferous. In one section of *Crepis*, the compartments of the plane or convex receptacle are variously ciliate or denticulate at the margin; in another, which includes *Crepis pulchra*, the margins are raised and smooth. This, again, in *Hieracium*, is a character which distinguishes the groups of *Cerinthoidea* and *Oreadea* from *Vulgata*. In examining a series of authentic specimens of *H. hypochæroides** from Giggleswick Scars in Yorkshire, it was this character alone which determined my placing it among the *Oreadea*, in the absence of other marked group-characters. It may be noted that in Dillen's herbarium at Oxford there are specimens of this plant long ago collected by Dr. Richardson in the *locus classicus* of Malham Cove,

* This British plant is omitted from *Index Kewensis*; and is wrongly cited in all references. The name was proposed by Gibson, for Yorkshire specimens referred by Smith to *Hypochæris maculata*, in the first volume of *The Phytologist*, p. 741, in the number which as appears from a note later on in the volume was published in Oct. 1843 (though undated).

Yorkshire. The specimen, under the no. 4896, was erroneously referred by Backhouse to *H. Schmidtii:* he had not seen it, but relied on a tracing of the plant sent to him by the then Curator.

Another important character is to be found in the stem-branching. In those species in which the stem is branched above the cladophore, a definite arrangement obtains in different groups. In one group the furcation is determinate, in another it is indeterminate with the branches alternate. In polycephalous forms, such as the common *H. silvaticum* Gouan, of the woods and on the rocks of hilly districts in Britain, the primary branching is botryose, and the secondary and terminal branches determinate, cymose, or sometimes pleiochasial or even umbellate. In descriptions this branching is often loosely given as paniculate or corymbose, which conveys little information. In most cases it affords a reliable specific character when associated with other group-characters.

To come now to a more vexed subject. In a notice of Fries contributed to this Journal (1879, 33) by Dr. A. N. Lundström, it was stated that Fries believed that all species as we know them now existed from the beginning. One is aghast to think of the geographical distribution affected by the multitudinous species described and named by Dahlstedt so long ago as—*then*. Now Fries and his followers are dead against the hybrid-theory in *Hieracium*, even as they are consistently opposed to the application of the principles of evolution, either intermittent or continuous, to the origin of species in plants. As the study of willows has been facilitated by the recognition of the fact that natural hybrids reproduce themselves like pure species, the blended characters being maintained through successive generations; so, I believe, in the study of the many forms of hawkweeds, the solution of many difficulties will be found in the recognition of their tendency to form natural hybrids, and in the inherent instability of their characters. It must not be forgotten that hybrids may remain sterile from lack of opportunity, because they have not been fertilized, or that an attempt at fertilization has been clumsily made, whether naturally or artificially. But this is not a case of *sterility*, it is merely *virginity*. The opponents of evolution have ever been anti-hybridists,* so ingrained has been the idea of the immutability of species.

The expressive terms of "phyllopodous" and "aphyllopodous" are not made use of by British hieraciologists. An apparently intermediate mode of growth is overlooked. In some species the radical leaves are still fresh at the time of flowering, but not numerous, some having withered, and others about to dry up. Such plants are "hypophyllopodous," and are best included in the former category. Such may be seen in some allies of *H. vulgatum*, and in *H. juranum* and *H. nobile*.

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* See a curious note in *Gardeners' Chronicle*, 1880, p. 177:—"In [those] times [1800–1840] it was considered by a section of no doubt worthy people to be almost an impious thing to raise hybrid plants. It was deemed a sacrilegious interference with the laws of the Creator, and so strong was this prejudice in certain quarters that some of the nurserymen at that day were fain to conceal the hybrid parentage of the plants they offered, and to catalogue them as if they were imported species from the Cape."

Again I recall the obligations due from critical botanists to the excellent series of carefully selected and prepared specimens issued by Messrs. Linton (1896–1901), which facilitate comparison with continental forms, and will materially assist in the most desirable reduction of the number of alleged "endemic species" among the British members of the genus. And in this connection, in the course of going through similar series of *exsiccatæ* issued by Scandinavian hieraciologists, I cordially endorse Mr. Hanbury's statement that occasions are not wanting in which more than one name has been given to the same plant.

GLAMORGANSHIRE PLANTS.

By R. E. and F. Cundall.

On reference to our memoranda and to specimens obtained in the neighbourhood of Porthcawl when botanizing there in 1898 and 1899, it seems that we can supplement the list published by Messrs. Marshall and Shoolbred (p. 248). The district is undoubtedly a rich one, and if well searched would be likely to yield more good plants than those enumerated. It is very probable that the alien species mentioned have been at some time introduced with ballast, in connection with the coal trade at Porthcawl, whence formerly much coal was shipped. Plants not recorded for Glamorganshire in Top. Botany, nor by Messrs. Marshall and Shoolbred, are marked with an asterisk; the determinations have been approved by Mr. J. W. White.

Brassica Cheiranthus Vill. In great abundance between Porthcawl and Newton along the shore.

Thlaspi arvense L, Cultivated land at Nottage.

**Reseda alba* L. Very plentiful, but local, Porthcawl.

**Viola Curtisii* Forster. In hollows among the sand-dunes.

**Saponaria officinalis* L. var. *puberula* Wierzb. Damp ground, Merthyr Mawr.

Spergula arvensis L. var. *sativa* Boenn. Cultivated fields at Newton and Nottage.

**Medicago falcata* L. Plentiful in a rough field, Porthcawl.

Melilotus arvensis Wallr. Sandhills, Porthcawl.

Vicia lathyroides L. Sandhills, plentiful.

Lathyrus sylvestris L. Merthyr Mawr.—*L. Aphaca* L. Sandhills, Porthcawl.

Alchemilla vulgaris L. var. *filicaulis* Buser. Nottage.

**Œnothera odorata* Jacq. Hollows among the sandhills.

Sambucus Ebulus L. Newton, Nottage, plentiful.

**Fœniculum vulgare* L. On sandhills by the harbour.

**Filago minima* L. Nottage.

**Inula Helenium* L. Nottage; in two places, abundant.

Artemisia Absinthium L. On the sandhills.

Senecio viscosus L. Sparingly on the sandhills.

Lactuca virosa L. Several plants near the engine-house, Porthcawl.

Campanula rapunculoides L. In small quantity, Merthyr Mawr.

Gentiana campestris L. Near The Rest.

**Borago officinalis* L. Field at the back of The Rest.

Heliotropium europæum L. Roadside near the beach.

Verbascum nigrum L. Sparingly on the sandhills.—*V. Blattaria* L. Near Mowdlam Church.

Linaria repens Mill. Sandhills, plentiful in one spot.

**Antirrhinum Orontium* L. Cornfields, Porthcawl.

**Scrophularia Scorodonia* L. In one spot on the sandhills, noted in both summers.

Mentha viridis L. At the back of the sandhills.—*M. piperita* L. var. *officinalis* Hull. On the sandhills.—*M. Pulegium* L. A pool at Nottage was full of this mint.

Salvia verticillata L. On the sandhills.—*S. sylvestris* L. With the last.

Nepeta Cataria L. Hedge-bank near Mowdlam Church.

**Anchusa officinalis* L. Sandhills near the engine-house, Porthcawl.

Marrubium vulgare L. At Sker.

**Leonurus Cardiaca* L. Hedge near Mowdlam Church, and a large patch between Pyle and Porthcawl.

**Lamium amplexicaule* L. Plentiful between Porthcawl and Newton.

Atriplex Babingtonii Woods. On the shore, Porthcawl.

Spiranthes autumnalis Rich. Abundant in the locality.

Epipactis palustris Crantz. Damp hollows amid sandhills; abundant.

**Narcissus pseudo-narcissus* L. Meadow at Nottage in profusion. —*N. biflorus* Curtis. Kenfig; a meadow full of it.

Iris fœtidissima L. In large quantity all the way between the mouth of the Ogmore and Southerndown.

Allium vineale L. var. *capsuliferum* Koch. Hedgebanks at Newton.

Colchicum autumnale L. Meadow near Newton Church.

WATSON BOTANICAL EXCHANGE CLUB REPORT, 1901–1902.

[The following are extracts from the Eighteenth Annual Report of the Watson Botanical Exchange Club for 1901–2, which was issued in May. The distribution was made by Major A. H. Wolley-Dod.]

Ranunculus ——. Clanrye River, near Sheepbridge, Co. Down, June 6, 1901.—H. W. Lett. This is what we take to be the real *R. pseudo-fluitans*, apparently first described as a species by Baker and Foggitt in a Report of the Thirsk Botanical Exchange Club about 1865. It is widely distributed in Ireland.—H. & J. Groves.

Stellaria media Cyr. var. *Boræana* (Jord.). (1) Shoeburyness, v.-c. 18, S. Essex, May 13, 1901.—A. H. Volley-Dod. (2) Coast, Portslade, v.-c. 13, W. Sussex, April and May, 1901.—T. Hilton. This does not appear to be, as I formerly supposed, a variety of dry exposed places, as I found it growing luxuriantly in the most shady places, and under bushes. It is peculiar in its pale colour, great brittleness, and elongated habit, the latter character being maintained even in the most exposed spots. It appears to be a good species. Mr. Hilton sends two forms (on three out of four sheets supplied), one with the elongated habit of my Shoeburyness plant, but more glabrous, the other with the tufted habit of type *media*, but peculiar in its very long petioles, even those of the upper leaves being sometimes twice as long as their laminæ. Mr. A. Bennett has some doubt as to the propriety of including this form under the name *Boræana*.—A. H. W.-D.

S. umbrosa Opiz. Hedgebank near Burstwick, v.-c. 61, E. Yorks., May, 1901.—C. Waterfall. Correct. Mr. Bennett writes in reply to a question, "Dr. Ascherson says that *S. umbrosa* Opiz.= *S. neglecta* Weihe = *S. media* var. *major* Koch, and although Syme seemed to see a distinction, still I think they are only forms of each other." I certainly think Mr. Waterfall's plant, with acutely tuberculate seeds, is different from the large form of *media* with bluntly rugose seeds, though what names they should respectively bear I cannot say.—A. H. W.-D.

Lathyrus hirsutus L. Stanmer, E. Sussex, cultivated land, 1900.—T. Hilton. This is another instance of the appearance of this species in connection with agriculture. Its natural appearance near cultivation has led to its admission as an indigenous British plant by some authors, but these cases are so few compared with those in which its origin is obviously alien, that we must be content at present, like botanists of other parts of N.W. Europe, to regard it as an introduced species. It is certainly native in bushy places in Central and E. Europe, and on dunes in Tunis.—S. T. Dunn.

Alchemilla vulgaris var. *filicaulis* (Bus.). (1) Pasture land, near Cottingham, v.-c. 61, E. Yorks., May, 1901.—C. Waterfall. (2) Bardon, v.-c. 55, Leicester, Sept. 8, 1901.—W. Bell. (1) Yes, typical *filicaulis*.—E. F. Linton. (2) Yes, about as hirsute an example as I have seen. This is probably our commonest subspecies.—E. F. L.

Sedum rupestre Linn. a. *majus* Syme. Southrepps, v.-c. 27, E. Norfolk, June 29, 1901.—H. D. Geldart. This has taken possession of a tract of land some miles square in North-East Norfolk, but it very rarely flowers, and, when it does so, is much injured by insects, which bite through the flower stem just before the flowers expand. It is not of recent introduction, for I have a specimen dated 1838.—H. D. G. I think this is correct. These plants want to be seen alive to study them.—A. Bennett.

Matricaria discoidea Linn. Casual, grassy roadsides, near Winshill, Burton-on-Trent, v.-c. 39, Staffs., Nov. 3, 1901.—A. B. Jackson. This is just the situation in which this species appears

to flourish best. Originally from N. America, it is now rather widely scattered in England and on the continent of Europe, but is doubtless often passed over as *Matricaria inodora*. It is a stiffer and more bushy plant than the latter, and has, moreover, 4- and not 5-toothed disc florets.—S. T. Dunn.

Ceratophyllum demersum Linn. Pool, Southcoates Lane, Hull, v.-c. 61, E. Yorks., June, 1901.—C. Waterfall. Is *C. submersum* Linn. var. It differs from *submersum* as figured by Schumann [Fl. Brasil. t. 125], by the surface of the fruit being smoother and by having marginal short broad-tipped spines. It is a departure in the direction of *C. cristatum* Spruce MS. = *C. demersum b. cristatum* K. Schum. Fl. Brasil. iii., pt. 3, p. 748, t. 125. It differs from *C. submersum* as described by Syme (Eng. Bot., 3rd ed., vol. viii., p. 124), in that the fruit is nearly smooth on the two surfaces, and has marginal short spines with a blunt top. It may be that some of the tubercles fall off in the fruiting, but I fail to see any cicatrices remaining.—A. Bennett.

Potamogeton lucens var. *acuminatus* Fr. Hickling Broad, v.-c. 27, E. Norfolk, September, 1901.—T. A. and C. Cotton. Not *acuminatus*, but very interesting. It almost appears as though the stem has been suppressed at each node, and become a phyllode: but fresh microscopic sections would have to be taken of it, and it would have to be studied *in situ*.—A. Bennett.

Carex teretiuscula var. *Ehrhartiana* (Hoppe). (1) Seaman's Moss Pits, near Altrincham, v.-c. 58, Cheshire, April 5, 1868.—S. H. Bickham. (2) Stanklin Pool, near Kidderminster, v.-c. 37, Worcester, June 6, 1901; and (3) Bog at Bracebridge Pool, Sutton Park, v.-c. 38, Warwick, June 7, 1901.—H. S. Thompson. (1) Yes, this is the plant which S. Gibson named *C. pseudo-paradoxa* in the *Phytologist*, Old Series, vol. i., p. 778.—A. Bennett. One of the original stations.—A. H. W.-D. (2) New to Worcestershire. —H. S. T. (3) Mr. Bagnall considers this is a state induced by the amount of water present. When the water retires, and the surface becomes partly dry, it becomes the type. See last year's Report, pp. 30-32.—A. Bennett. Mr. Marshall writes of all these gatherings: "I must own that I can see nothing really distinguishing this variety from the type," and Mr. Bennett concurs with my suggestion that it is really only a form.—A. H. W.-D.

Chara baltica Bruzel. Loch Stennis, v.-c. 111, Orkney, September, 2, 1901.—F. C. Crawford. Named by Messrs. H. and J. Groves.

BOTANY IN ENGLAND A CENTURY AGO.

[The following letters, for the translation of which from the German we are indebted to Miss Aimée Sewell, were published in vol. ii. of Schrader's *Journal für die Botanik*. The writer, Dr. Henry Adolphus Noehden, was brother to Dr. George Henry Noehden, a librarian of the British Museum, of whom a brief account will be found in the *Biographical Index of British Botanists*

and more detailed information in Mr. Druce's *Flora of Berkshire*, p. clv, and in the *Gentleman's Magazine* for 1826, p. 466. The only notice we have found of H. A. Noehden is the following brief mention in the *Annals of Botany*, ii. 206, under the date Nov. 1, 1804: "About the same time died at Göttingen, too early for the sciences, Dr. John [*sic*] Adolphus Nöhden, known also in this country as co-editor of the *Medical Journal*, and author of several botanical papers." One such paper—"Specimen inauguralis in quo de argumentis contra Hedwigii theoriam de generatione muscorum quædam disserit"—was published at Göttingen in 1797, and another, on the form and distribution of pollen, in the first volume of Schrader's *Journal*. To the third volume of this he contributed a paper on the position of botany in England, the result of the visit to which the letters refer. It contains a very full and interesting account of the Banksian collection and other herbaria, and would be well worth translating, did space permit; but it occupies forty-three pages, and moreover is not complete, the promised continuation never having been published.—Ed. Journ. Bot.]

London, Aug. 1, 1799.

Writing to you from abroad, my dear Friend, is a ticklish business, for you print your foreign letters, and a man must be on his mettle to spare you from the bumptious critic with his remark that half of them are not worth publication. And unluckily my present situation affords me neither time nor inclination to worry over style or diction. You will have to let me put things before you as simply as if I was talking. However, I do not write with the expectation of seeing my letter in print, but shall leave it to you to make what use of it you please.

You will have heard from Herr Stromeyer, to whom I wrote at once from Yarmouth, that I could not get away from there on account of my passport. This was so far a fortunate circumstance for me that otherwise I should have missed a great many pleasant hours, and not have made the acquaintance of a man whom I shall always hold dear for the sake of the friendliness he lavished upon me. I landed at Yarmouth about ten o'clock on the night of Thursday, July 17. One of my first walks next day, as you may readily suppose, led me to Mr. Turner's, but, imagine my bad luck! he was from home and not expected back till the following day. If I had got my passport then, I should have had to leave Yarmouth without making his acquaintance. However there was no passport to hand for me, and it turned out just as pleasant as in other circumstances it would have been disagreeable, that I was compelled to remain in Yarmouth. On Saturday morning I again went first thing to Turner's, and found him at home, but so busy that I could not get more than a few words with him. He invited me to spend the evening, and I met with an extremely friendly reception. He showed me his different collections. His collection of mosses is not very remarkable and is almost confined to English ones. These, as well as the other cryptogamous plants, were however labelled according to the Linnean System. Dickson is now the

authority to whom all lovers of cryptogamy bow; Hedwig's system is either unknown to the majority or has no vogue because of the constant use of the microscope it entails. Hoffmann's classification of lichens is just as little popular. I obtained several rare mosses from Mr. Turner. At supper we had the old schoolmaster Lilly Wigg, who has discovered some beautiful Fuci and Ulvæ and possesses a fine collection of them, which in point of specimens must be admirable. But he is very unwilling to show it, and many of his botanical friends in this neighbourhood have never seen it.

The next morning Mr. Turner showed me his collection of aquatic plants. It is indisputably one of the most complete to be found in England, and includes many new varieties. A few days before my arrival in Yarmouth, Turner had returned from a great botanical tour which he made in company with Sowerby to the north of England—the Lakes, as they are called—Cornwall, and different parts of the coast—Weymouth, for instance.* They found some rarities, as for example *Dianthus cæsius*, *Ligustrum cornubiense*, *Isoetes lacustris*, which grows plentifully in the great Cumberland lake, beside many aquatic plants of the genera *Fucus*, *Ulva* and *Conferva*.

After breakfast we went out botanizing on the shore and found *Convolvulus Soldanella*, *Salsola Kali*, *Poa maritima*, *Centaurea Calcitrapa*, *Arenaria peploides*, and many more, and I supplied myself with representative specimens. In the afternoon I made a solitary excursion to another part of the shore, and found, besides the above, *Conferva coccinea*, *Fucus serratus*, *divaricatus*, *siliquosus*, &c. Towards evening Mr. Turner joined me again and we visited another locality, where we found *Trifolium subterraneum*, *suffocatum*, *stellatum*, and on the road to Colston village *Urtica pilulifera* growing pretty freely. Here I got acquainted with another botanist, named Stone. With him we planned a great botanical excursion for the next day; *Trifolium stellatum*, *Frankenia lævis*, *Chelidonium glaucium*, *Rosa spinossissima*, *Sedum anglicum*, *Erica cinerea*, *Tillæa muscosa*, *Anagallis tenella*, and many other rare plants, were its results.

The next day I determined to go to Smith at Norwich, which is only twenty-four English miles from Yarmouth. Mr. Turner gave me a letter to a certain Ritchford,† a skilled botanist, who was to introduce me to Smith. Ritchford, a good honest fellow advanced in years, received me in the kindliest manner, and we set out for Dr. Smith's house, but found he was not at home. I therefore returned with Ritchford, from whom I acquired a fine consignment of rare English plants. Later we found Smith at home, remained to dinner with him, and I spent a most delightful time in the society of this eminent man and an examination of the Linnæan Museum —indeed, the time that I was able to spend in Norwich was far too short. The Linnæan Museum is contained in two large, but not wide, cases. On their doors are nailed tin models of the different

* [An account of this tour, so far as the western counties are concerned, will be found in Trans. Linn. Soc. v. 234–41.]

† [A misprint for Pitchford. See Biogr. Index, p. 136.]

leaf forms according to which Linnæus explained his nomenclature. The plants themselves are gummed on to separate sheets with the name below, and on the back their *locus natalis* with a few remarks. There are many duplicates; notably from the different sources from which they were sent to Linnæus. On the whole they are very well preserved considering their age. During my short stay I looked through the genera *Veronica*, *Aster*, and *Solidago*, and thereby was enabled to solve many doubts I had had about several species of these genera. Dr. Smith was so kind as to give me *Salix reticulata* from the Linnean Museum, which I shall look upon as the glory of my collection. Smith is extraordinarily busy. The *Flora Britannica* gives him a great deal of work. The first five volumes of this work I saw at his house; a new number of the Transactions of the Linnean Society will shortly be issued.

I left Norwich most unwillingly, after the kind reception I had met with, and reached Yarmouth about eleven o'clock at night. The next morning I got my passport and that afternoon travelled to London. Of my short stay in that place I will say nothing at present. By chance, when walking in the Park with my brother I met my old friend Dr. Langsdorf, who travelled in Portugal with the Prince of Waldeck. He gave me news of Count von Hoffmansegg and Professor Link. He knows both well, and made several contributions to their *Flora Lusitanica*. They were principally in the north of Portugal, while Langsdorf was collecting in the south. The number of new plants discovered by them must be considerable. Professor Link has been most industrious; he has gone little into society, but has always been collecting and describing plants. The Count, who at the present moment is alone in Portugal, is not now starting for Brazil, and Langsdorf thinks permission to go there is not to be obtained, at least during the war.

I left London after two days' stay and went to Eton. There I made the acquaintance of two botanists, Messrs. Gotobed and Jenkins, with whom I severally visited its different localities. *Œnanthe crocata* grows freely thereabouts and I helped myself in proportion. From Eton I made a trip to Kew, was kindly received by Aiton and obtained many interesting objects. After staying a week at Eton I came back to London, whence to-morrow I travel into the country, to Yorkshire, and from there shall probably go on to Edinburgh. Yesterday I conversed with Banks, Dryander, and Sowerby. But of this another time.

London, 6 Nov. 1799.

. . . . . Botany is a favourite study in England, one might almost say a fashionable one. There are many botanists here, and still more amateurs whose number increases daily. Most English botanists only study the plants of their native country. English botany occupies them principally if not entirely, and as I think quite rightly and wisely. His native flora should be preferably nearest the heart of a man who has not time to traverse the whole range of the vegetable kingdom, and it is besides characteristic of the English: no nation clings so closely to its native land and

seeks to acquire so perfect a knowledge of it. Still there are botanists among them who do not confine themselves entirely to home plants, an observation I only design to make with regard to those who have become known through their writings; the others have given sufficient proof of it to make the remark in their case unnecessary.

The Mæcenas of botany as well as of all natural history is Sir Joseph Banks. His collection of plants and his library are at the command of every student of nature. To begin with, it is certainly one of the largest in existence, though the total number of plants contained in it cannot be accurately determined. Both Gronovius's and Jacquin's collections are included in it; and the rarest things from all parts of the world are to be found there. Most of its plants are arranged in accordance with the Linnæan collection, and this greatly increases its usefulness to the botanist. The specimens are gummed on to half sheets of foolscap, their names written below them in pencil, and the habitat of the plant on the back. Each genus forms a separate file, and the whole collection is kept in mahogany cases which are piled one upon another and form a huge press, but when needed can be taken apart so that any case can be removed separately. In these cases are drawers so that the plants can be easily taken out. There is a catalogue of the genera, whose numbers correspond with labels inside the drawers, by which means the plants of this vast collection can easily be found. The cryptogams, and also ferns and lycopods, form a small proportion of the whole, less attention being given to them. In addition there is a noticeable quantity of succulent plants preserved in spirits; a good collection of the genus *Stapelia* especially pleased me. There are besides a great number of parcels containing many rarities; among others I saw some plants from Patagonia, almost all new, the greater part being Syngenesia of the most singular forms.

You will know the library from Dryander's excellent catalogue. The fifth volume of this work in the form of a first supplement will appear in a couple of months' time and so be completed up to date. Among the manuscripts too there are many descriptions of plants sketched by Solander, containing excellent observations. The manuscripts left by König consist of many volumes and are full of important information, botanical and otherwise, for instance his travels in the East Indies, Ceylon, &c.; it is to be wished Mr. Dryander could find time to make much of it public. There is also good store of Roxburgh's descriptions and illustrations of the plants of Coromandel, and a new part will shortly appear. I saw many drawings and paintings of plants by the great artist Franz Bauer quite beyond praise. Andrews's illustrations of heaths are thought fine, but they pale before Bauer's drawings. All these collections have been kept in order by Mr. Dryander, who deserves the highest respect both for his botanical knowledge and for his distinction of character. Dr. Schulzen, an agreeable and accomplished young man, is his assistant.

I have been twice to Kew, where the crowd of hothouse plants is too extraordinary and the garden too well known for any

description of it to be necessary. You must see it yourself if you would form any idea of its size or its horticultural range. A new edition of the *Hortus Kewensis* is not to be expected at once; it will certainly be a welcome boon to botanists because of the number of new plants in the gardens. Young Aiton and his brother keep them in fine order and they are known as a most agreeable and clever pair. Brompton Gardens, or the late Curtis's gardens, are now managed by Mr. Salisbury. They lie about two miles out of town, and are very pretty and well cared-for. There are different parts where grapes, poisonous and useful plants, English and foreign plants, English shrubs and trees, &c., are grown. The forcing house is nice, though not large. In the gardens is a charming botanical library which is very useful to any one visiting them. A subscription to these gardens is of the greatest use to London lovers of botany. You pay a guinea a year, or by paying two you get the seedlings grown in the gardens.

In Edinburgh I saw their botanical gardens, which are very pretty and contain many fine plants; Dr. Rutherford, a distinguished man, is Professor of Botany there. I also made acquaintance with a gardener, Mr. Mackay, who has a very good knowledge of the Scotch flora, and from him I got some fine plants.

No. 25 of Andrews' *Botanists' Repository* has been issued; among other plants figured in it is *Persoonia lanceolata*. No. 96 of Sowerby's *English Botany* is out. I shall always recall with pleasure my acquaintance with this distinguished man; I saw at his house a collection of artificial fungi in clay that were so naturally copied that at first sight they are taken for real fungi. They have the colours of the original and are mounted on thin boards the colour of earth, which have white edges on which the names of the fungi are painted. It is convenient to treat the collection like this, as they do not lend themselves well to preservation.*

Smith's *Flora Britannica* is printed to p. 676; the genus *Draba* will appear in the next issue. The work will run to a great many parts. Of Banks's library I should observe that the huge collection of minor botanical works in which it is so remarkably rich, originated with Gronovius, whose heirs sold it to Banks for about 300 gulden; to this further additions have been made.

9 Jan. 1800.

You will have learnt from our friend Herr Stromeyer that I spent the greater part of November last at Eton with my brother. In company with Messrs. Gotobed and Jenkins and my brother, I made at least twice a week an excursion in the neighbourhood after cryptogams. Among many mosses we found *Hypnum Sherardii* (Dickson), *Bryum fragile* (Dickson), *calcareum* (Dickson) and *virens*, as well as many fungi and lichens, among the latter of which one, according to Dickson, is new. At the same time I visited Dr. Goodenough at Windsor. He received me very kindly, but could not show me his collection owing to an engagement, and I had

* [For the history of this collection, now exhibited in the botanical gallery of the Natural History Museum, see Journ. Bot. 1888, pp. 231, 268.]

to leave Eton the next day. Shortly before my departure I expect to be able to visit Goodenough again.

I meet Dickson every Sunday in Banks's library and spend many instructive hours there in the study of cryptogamic vegetation. You know him to be *homo literatus*, but he possesses extraordinary acumen in this line of plants, and differentiates them most accurately. He has discovered too that the much discussed *Trentepohlia* is nothing more than a *surculus bulbiferus* of the well-known *Mnium annotinum* (Linn.). He found ripe capsules together with *bulbis* on many individuals, and will lay before the Linnean Society a description and drawing of it. That the discovery had been made earlier he was unaware. There remains no further doubt about the *Trentepohlia*; it has been finally determined.

Withering, in the second edition of his work, introduces a *Splachum Frœlichianum*, and quotes in this connection Hedwig's description and delineation of this moss. Dickson found the moss and also possessed a specimen got from Withering, but found it neither corresponded with Hedwig's description, nor—still less—with the delineation, and so was always doubtful whether Withering's *Splachum Frœlichianum* was identical with Hedwig's moss. The specimen in my pocket-herbarium of mosses which I got myself from Hedwig, convinced him however that Withering's *Splachum* is very different from Hedwig's, and consequently has determined a new variety, to which he intends to give the name *succulentum*.* You have a specimen of this new moss.

I was at the Linnean Society the day before yesterday. A very clever treatise on the genus *Ehrharta* was read by Swartz; he enumerated nine species of it. The accompanying drawings were admirable. The treatise appears in the 5th volume of the Society's Transactions. I also paid a short visit to George Hibbert Esq. owner of the Murray Herbarium. The best things in the collection are a parcel of Siberian plants (Pallas's), and a small collection of ferns from Canada.

SHORT NOTES.

Supposed Hybrid Grass.—After having watched during another season the development of the grass which I reported (p. 41) as a probable hybrid between *Lolium perenne* L. and *Bromus commutatus* Schrad., I believe that Mr. Druce is right in his contention that it is a form of *Lolium perenne*, in which, as Dr. Masters observed (Journ. Bot. 1863, p. 9), the stamens and pistils are replaced by scales; and that the utter sterility of the plant is due, not to hybridity, but to a distortion of the sexual organs.—E. F. Linton.

Goodyera repens in Norfolk.—I found this in poor condition two years ago on Beeston Common, Norfolk; and lately in abundance in pine woods in the parish of Bodham, in the same county. The two places are some four or five miles apart, with a low

* [*Oedipodium Griffithianum* Schwaegr.]

watershed between. The plant grows amongst the heath and ling which covers the poor, sandy soil of the district.—F. C. J. Spurrell.

Erythræa littoralis × Centaurium.—In a paper entitled "Variations in Erythræa" (*Science Gossip*, Sept., 1897), I called attention to the plant alluded to by Mr. C. E. Salmon on page 294, *ante*. It is very interesting to find that its peculiarities have quite independently attracted his attention also. Mr. Salmon says: "The flowers were of the *littoralis* type; the stem-leaves, however, were decidedly not linear, but broader." How similar my own impression was may be seen from the following extract from the paper mentioned: "With the technical characters of *E. littoralis* as regards relative length of corolla-tube and calyx, but with broader leaves and general habit of *E. Centaurium*. The leaves are never strap-shaped, but oval-lanceolate." I suggested the possibility of its being a hybrid, but described and figured it as *E. littoralis* var. *intermedia*.—J. A. Wheldon.

Nomenclature.—In a recent number of this Journal (p. 230), a variety of *Hieracium anglicum* Fr., described by one of us in the introductory sheet to Fasc. vi. *Set of British Hieracia*, was quoted as though we were joint authors of it. We therefore draw attention to what we formerly laid down (Journ. Bot., 1893, 145), and would extend the scope of that statement to all species or varieties published by us in joint productions. We have not intentionally described any species or variety collectively. Suffice it to say that there are only two authorities at present of our name—*viz.* "Linton" (= E. F. Linton), and "W. R. Linton"; and that in no case can the surname be interpreted in a plural sense with our consent.—E. F. & W. R. Linton.

NOTICES OF BOOKS.

International Catalogue of Scientific Literature. First Annual Issue. M. Botany. Published for the International Council by the Royal Society of London. London: Harrison & Sons, 45, St. Martin's Lane. Vol. I. Part i.: 1902 (May). 8vo, pp. xiv, 378.

We have here the first portion of the new series of bibliographies which are intended to take the place of the *Catalogue of Scientific Papers* hitherto prepared entirely by the executive of the Royal Society from 1800 to 1883, and published by that body in twelve quarto volumes. The form and scope being a new departure, seem to demand some special notice in these pages.

The preface gives some particulars of the circumstances which led to the issue of this part. In the first volume of the *Catalogue of Scientific Papers*, issued by the Royal Society in 1867, will be found a history of that work, and now forming a series of indispensable value to the working naturalist. Unhappily, this record only brings us down to the end of 1883, and the remaining

seventeen years of the last century are not yet within the reach of enquirers, though work is being done to bridge over the interval. It is certainly unfortunate that a period so prolific of results should not be recorded in a way comparable with the preceding years of the century.

For many years it had become apparent that the Royal Society was overweighted in its endeavours to accomplish so much bibliographic work, and one result was the long interval between the issue of its volumes and the close of the period embraced by them. The Council felt that the desired result could only be achieved by some form of international co-operation. To that end conferences were arranged, which met in London in 1896, 1898, and 1900, between which a large amount of preparatory work was done in committees of specialists. Difficulties of varying degree were grappled with, and finally a scheme was framed, which received the approval of the delegates; regional bureaux were established having direct relation with the central bureau in London; instructions to these regional bureaux were issued, and work was to be started with the first day of January, 1901.

Seventeen yearly volumes in all are to be issued, ranging over the extent of subjects embraced by the Royal Society, and a subscription of as many pounds sterling will ensure the delivery of the whole of the seventeen volumes on publication. Besides those academies and institutions which are willing to subscribe for all, there are many more whose activities are confined to a more restricted area, and these are to be encouraged to subscribe for such sections as may be desired, while single sections are also at the disposition of private workers. To take one instance: Mathematics or Astronomy are obviously out of place in the library of the Linnean Society, which will subscribe for six sections, cognate to its work.

The volume now before us, completed as to manuscript in January, was ready in May, the date printed on its wrapper and title-page; but it was considered advisable to keep it back till another companion volume should be ready to accompany it; the remaining subjects are to follow as matter is forthcoming.

The volume on Botany may therefore be regarded as the pioneer; it has had to encounter and bear the brunt of the various difficulties which must always confront a new venture, especially when the work is so far experimental. Another disadvantage experienced in preparing this volume was that, though practically it embraces the whole of the botanic issues in the United Kingdom during 1901, it only takes in a portion of such important publishing countries as Germany, France, and the United States of America. The reason for this is, that the regional bureaux in those countries did not get their machinery in working order till a somewhat advanced period of the year, consequently the whole of their issues could not be supplied to the Central Bureau in time to be included, while certain other countries sent nothing within the limit of time. This omission is to be made good in the second part, which it is intended shall be put into the printer's hands within the next few months.

Passing on to examine the book itself, after the Preface, we find a list of the Regional Bureaux, twenty-nine in all, with their responsible chiefs, and certain instructions to ensure, as far as may be, uniformity in plan on the part of contributors.

The Schedules in four languages follow. These show the arrangement into subject with the "Registration" numbers, which consist of four figures prefixed, which are used in compiling the slips as supplied by the various bureaux, and are also placed at the head of the pages to denote in a brief form the subject to be found on the respective pages.

The alphabet of authors then follows. In this portion the new issue approximates to the old *Catalogue of Scientific Papers*, but each entry has in addition the Registration Numbers under which the paper will be found ranged in the various subject headings. An idea of the form may be obtained by an example:—

> Hill, A[rthur] W[illiam]. The histology of the sieve-tubes of *Pinus*. Ann. Bot., Oxford, **15**, 1901. (575–611, pl. 31–33). 719. [2600 2580 6500].

The reference is according to the list of periodicals and serials consulted and searched, which are recited at the end of the volume; the volume in black type; the year of publication, and, if differing, the year on the title-page; the first and last pages given in parentheses; plates, if any, or figures, with the registration numbers indicating where this paper will be found under subjects enclosed in square brackets; and lastly, the running number of the title, which permits of its being briefly referred to when dealing with new species or genera. After the author-list follow the subject-lists according to the schedule. The schedule is itself divided into what may be termed Introductory, Morphology, Anatomy, Physiology, Pathology, Evolution, Taxonomy, and Geography, *i. e.* Distribution, the last in relation to Plankton especially, the general indication of geographic distribution being shown by one or two letters taken from the scheme of Section J, Geography; thus, Europe is shown by the letter *d*, the British Isles being further differentiated by an added *e*, *de* indicating that the paper has reference to some part of the United Kingdom.

Such in short is the plan on which the present contribution to the bibliography of Botany has been constructed. To many, the ideal plan would seem to give a list according to authors, and then add a subject-index. The plan adopted is more cumbrous, but is part of the price which has to be paid for international co-operation. As four modern languages have to be the basis of the work, it would need four indexes, or a co-operative index, to deal with all the subjects adequately. This is obviously out of the question, and the plan adopted is that which was framed by the International Council, who are the directing body between the meetings of the International Conventions, which are to be held at intervals of five and ten years, to make such alterations in the arrangements as may seem advisable, and for general oversight of the work.

In the taxonomic division the larger groups are divided, and under each group the Orders are given of the plants. In the

lists of new genera and species the arrangement is under the group, as, for instance, Pteridophyta, then to Natural Orders, and finally to species.

It will be understood that considerable difficulty has been experienced in getting the various bureaux to send in their slips according to the specimens circulated. The first place must be given to the Japanese, who sent in their slips ready printed, and only needing to be sorted into place. Other bureaux, which need not be specified, contented themselves with more or less legible writing, leaving much information to be supplied by the Central Bureau; others, again, supplied several printed copies of their bibliography, only requiring to be cut up, pasted on cards, and sorted. In addition to these diversities, there were various readings of the instructions. Thus, as economic botany was expressly excluded, the British Regional Bureau did not send in slips of applied botany, while the German Regional Bureau took a much wider view, and contributed many titles of pharmaceutical papers. It may further be noted that all chemical papers, though dealing wholly with plants, are relegated to Section C, Chemistry, and comparatively few can be cited under Section M, Botany. The work must be judged as a part of the whole, and not as an independent bibliography. Another consideration is, that the pioneer part of the first year's issue of a work on so large a scale and under such new conditions must necessarily be experimental, and therefore succeeding issues may be looked for to show some change in details, or even in arrangement. The numbers of the schedule are purposely left with wide intervals to permit of interpolation, for nothing is more certain than that unexpected subjects or divisions will occur in the course of enumeration. One thing should ensure the gratitude of workers, and that is, that the annual issue is likely to appear within a reasonably short time of the close of each year, so that botanists in all departments may look for prompt information of papers and volumes published in their respective departments.

B. D. J.

Mendel's Principles of Heredity. (With Portrait.) By W. Bateson, M.A., F.R.S. Pp. xii, 212. Cambridge University Press. June, 1902. Price 4s. net.

English biologists will be grateful to Mr. Bateson for his championship of Mendel as one of the pioneers in the application of exact methods in the study of evolution, mainly based on experimental observations on the affinities of closely allied forms of flowering plants.

Gregor Johann Mendel was born in 1822 at Heinzendorf, in Austrian Silesia. In 1843 he entered as a novice the "Königinkloster," an Augustinian foundation in Altbrünn. In 1847, at the age of twenty-five, he was ordained priest. After a course of natural science at Vienna, he returned to his cloister, and became a teacher in the High School at Brünn. He was subsequently made Abbot of Brünn, and died there 6th January, 1884. The experiments described in his papers were carried out in the garden of his

cloister, and were chiefly concerned with the phenomena, physiological and statistical, of hybridization. Alone and unknown, from 1865 to the close of his life, Mendel worked at the deepest problems of plant-biology,

"Voyaging through strange seas of thought alone,"

and, as Mr. Bateson rightly says in his spirited attack on the illogical exposition and irrelevant criticism of Mendel's views by Prof. W. F. Weldon,* had Mendel's work come into the hands of Darwin, it is not too much to say that the history of the development of evolutionary philosophy would have been very different from that which we have witnessed.

The book consists of three parts—(1) Mendel's Experiments in Plant-Hybridization; (2) Mendel's Experiments with *Hieracium*, a short paper of seven pages; and (3) a Defence of Mendel's Principles of Heredity, about half the book. These sections are preceded by an introduction of thirty-nine pages on the Problems of Heredity and their Solution, which has previously appeared in a shorter form.† Mendel's two papers are translated *verbatim* from the somewhat inaccessible German original.‡ To the subject of plant-hybridization many careful observers, such as Kölreuter, Gärtner, Dean Herbert, Lecoq, and Wichura, have devoted a part of their lives with inexhaustible perseverance. Wichura's profound investigations into the hybrids of the willow mark an important stage in the recent history of phytology. The true spirit of philosophic inquiry pervaded all the investigations which Mendel undertook. He made his experiments with laborious and scrupulous care, and applied a relentless logic to the statistical record of his facts. He neither theorized on the observations of others, nor attempted to deduce general conclusions from an imperfect record, but co-ordinated his *data* without bias and without preconceived ideas.

In the matter of hybridization in *Hieracium*, it is to be regretted that Fries, Lindeberg, and Elfstrand in Scandinavia, the veteran Norrlin in Finland, and recent workers in the genus in this country, have been so dead against the hybrid-theory. Fries would have none of it; Mr. E. S. Marshall looks askance at it; others ignore it. Mendel points out that in *Pisum* the hybrids, obtained from the immediate crossing of two forms, have in all cases the same type, but their posterity, on the contrary, *are variable, and follow a definite law in their variations*. In *Hieracium*, according to Mendel's experiments, the *exactly opposite phenomenon* seems to be exhibited. Now, according to Wichura, the hybrids of *Salix* reproduce themselves like pure species. In *Hieracium*, may we not take it we have a similar case? And may we not draw the conclusion that the polymorphism of both the genera *Salix* and *Hieracium* is connected with the special condition of their hybrids, as opposed to the condition of those of *Pisum*? Though even-minded biologists

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* *Biometrika*, i. pt. 2 (Feb. 1902).

† *Journ. Roy. Hort. Soc.*, 1900.

‡ Verh. Naturf. Ver. in Brünn, abhandl. iv. (1865) *et seqq.*

may not be quite so enthusiastic as Mr. Bateson in his assertion that "soon every science that deals with animals and plants will be teeming with discovery, made possible by Mendel's work," enough has been said to show that the erstwhile author of *Materials for the Study of Variation* is justified in his re-discovery of the Abbot of Brünn, and in setting forth his claims to a place in the scientific roll as a patient investigator and a practical exponent of the cardinal principles of Variation and Heredity.

FREDERIC N. WILLIAMS.

Hand-list of Herbaceous Plants cultivated in the Royal Botanic Gardens, Kew. Second edition. 8vo, pp. lx, 1235. Price 1s. 9d. Sold at the Gardens.

THE title "Hand-list" seems singularly inappropriate to a volume which, weighing two pounds two ounces, occupies 2470 pages and is of about the thickness of an average brick. It is printed only on one side of the paper, and this extravagance is augmented by the broad margins and widely spaced lines, there being less matter on a page than in any work of the kind with which we are acquainted. The book might quite easily be reduced to one-sixth of its bulk without any diminution of the information it contains, and to the great advantage of the users. We confess we do not know who these may be, but we learn from the preface that the previous issue "met with a ready sale," so that there must be a demand somewhere for a work of the kind. The former, however, was at least easily portable, whereas the present is ill adapted either by weight or shape for the human pocket.

Certain details have been added to this edition. Among these is the addition of English names, "where these exist." We quoted on p. 304 the opinion of an intelligent reviewer as to the uselessness of this addition; but we were not prepared to find so extraordinary an "English" nomenclature as that which is given. For example, the whole genus *Ranunculus* is called "Buttercup; Crowfoot;" but the former name, which is definitely associated in English with three species—*R. bulbosus*, *R. acris*, *R. repens*—is not assigned to any one of these; the first is called "St. Anthony's Turnip"—a name found indeed in Dr. Prior's volume, but absolutely unknown, either now or in the past, as in actual use; the other two have respectively the book-names "Upright Crowfoot" and "Creeping Crowfoot." *Trifolium medium*, which does not grow in meadows, is "Meadow Clover," *T. pratense* (which does) being "Common Clover"; the whole genus *Trillium* is "Three-leaved Nightshade"; *Veronica officinalis* bears the Welsh name "Fluellen"; the genus *Erysimum* is "Perennial Wallflower"; the genus *Melittis* is "Bastard Balm," while the only species it contains is "Honey Balm;" *Parochetus communis* is "Blue-flowered Shamrock" (!); *Lepidium Draba* is "Whitlow Cress"; *Scrophularia nodosa* is "Great Pilewort," a name found indeed in Parkinson's *Theatrum* and thence in the *Dictionary of English Plant-names*, but otherwise unknown either in books or in common use; and so we might

continue. On the other hand, for such plants as *Chrysanthemum segetum* and *Senecio Jacobæa* no English names are given. It is bad enough that Kew should encourage the absurd persons who suppose that every plant possesses an "English name," but it is far worse that the names supplied should be of the kind of which we have given examples.

We learn with regret and surprise that "no special provision will for the present be made for the wants of elementary students," as "the site of the 'Students' Garden' was required for the new wing of the Herbarium." This garden, although the naming of the plants contained in it at times left something to desire, was one of the most useful features of Kew, and it should not be difficult to find space for it in the extensive grounds. Perhaps now that the Gardens have been transferred to the Department of Agriculture, this and other developments in a practical direction may be set on foot. In this connection it may be pointed out that the absence of any popular guide to Kew Gardens deprives them almost entirely of their instructional value, so far as the general public is concerned. It is remarkable, considering the importance which is supposed to be attached to the increase of educational facilities, that such a Guide, which existed throughout the directorates of the Hookers and extended to thirty editions, should for so many years have been allowed to lapse. The last edition, prepared by Prof. Daniel Oliver, with admirable illustrations by W. H. Fitch, contained a large amount of valuable and interesting information, and was useful even apart from the Gardens to which it was primarily intended as a guide. But we fail to conjecture how the public are to benefit by the arid and bulky "hand-lists" which have taken its place.

A Monograph of Geaster.

Mr. C. G. Lloyd has issued a monograph dealing with American species of the Geastræ, under which he includes *Geaster* and the subgenus *Myriostoma*, a form with several orifices of the peridium and with several pedicels supporting the fruiting body. Lloyd has followed Desveaux and Corda in giving it generic rank. There is only one species, *M. coliformis*, which has a very wide distribution. In our own country it was collected in Norfolk.

There are twenty-two species of *Geaster* recorded in the monograph; those exclusively American are *G. Morganii* Lloyd, that had previously been referred by Morgan to *G. striatus*; *G. delicatus*, first described by Morgan from Nebraska; and *G. radicans* Rav., from the Southern States.

Lloyd's new species, *G. Smithii*, is the plant that was described and figured by Mr. W. G. Smith in the *Gardeners' Chronicle*,* and placed by him under *G. striatus* DC. Morgan subsequently found the same plant in America, and determined it to be *G. umbilicatus* Fr. Lloyd finds reason to dissent from the conclusions of

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* Gard. Chron. 1873, p. 469, fig. 88.

both of these fungologists, and considers the plant specifically distinct.

G. velutinus comes under the group with sessile peridium and smooth orifice. In its immature condition it was named *Cyclo-derma Ohiensis* by Cooke, to whom it had been sent by Morgan. Later, Morgan found the plant again, and described it as a new species, *G. velutinus*. Lloyd chooses to retain the latter name, as the species *Ohiensis* was based on a mistake. He takes every occasion to insist on the futility of publishing authorities, as being an unnecessary pandering to the vanity of species-makers. He assumes that his description and determinations are absolutely final, and that it is unnecessary for the student to enquire further.

With the exception of *G. Berkeleyi* Mass., and *G. Michelianus* W. G. Sm., the British species have all been found in America. The specimens are beautifully illustrated by photographs.

A. L. S.

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*ARTICLES IN JOURNALS.**

Botanical Gazette (16 July). — J. C. Arthur, 'The *Uredineæ* in America.'—A. Nelson, 'Rocky Mountain Plants.'—G. F. Atkinson, 'Three new genera of Higher Fungi' (*Eomycenella*, *Eoterfezia*, *Dictybole*).—E. W. Berry, 'Phylogeny of *Liriodendron*.'

Bot. Zeitung (16 Aug.). — A. Meyer, 'Die Plasmaverbindungen und die Fusionen der Pilze der Florideenreihe' (1 pl.).

Bull. de l'Herb. Boissier (31 July). — F. Stephani, 'Species Hepaticarum' (cont.: *Plagiochila*). — H. Christ, 'Spicilegium pteridologicum austro-brasiliense' (cont.). — G. Beauverd, 'Les caractères extérieurs du *Charophyllum hirsutum*.' — R. Chodat, 'Plantæ Hasslerianæ' (cont.). — A. de Coincy, *Echium Bonnetii*, sp. n.—W. Becker, *Viola splendida* & *V. Sieheana*, spp. nn.

Bull. Soc. Bot. France (xlix, 5-6: 30 July). — E. Henry, 'Nouveaux champignons parasites des chênes.' — C. de Rey-Pailhade, '*Euphorbia sulcata* en France.' — E. Perrot, 'Anomalie de feuilles d'*Aristolochia Sipho*.' — Venance Payot (25 June, 1826–13 March, 1902).

Bull. Soc. Bot. Ital. (May–June; received 18 Aug.). — G. Arcangeli, '*Drosera rotundifolia*.' — E. Levier, Le genre *Calypogeia*. —F. Cavara, 'Conoscenza del nucleolo.'

Bull. Torrey Bot. Club (25 July). — J. C. Torrey, 'Cytological changes accompanying secretion of diastase' (1 pl.). — H. J. Banker, 'Historical review of genera of *Hydnaceæ*.' — C. L. Shear, 'Mycological Notes.'—E. J. Durand, 'N. American Discomycetes' (cont.). — F. Lamson Scribner & E. D. Merrill, 'New and noteworthy N. American Grasses.' — A. Eastwood, 'New Nemophilas'

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* The dates assigned to the numbers are those which appear on their covers or title-pages, but it must not always be inferred that this is the actual date of publication.

(1 pl.). — E. G. Britton, *Trichomanes radicans*. — E. W. Berry, *Liriodendron Celakowskii*.

Gardeners' Chronicle (16 Aug.).—*Kalanchoe Kirkii* N. E. Br., sp. n.

New Phytologist (24 July). — F. W. Oliver, 'Gymnospermous seeds.' — V. H. Blackman, 'Coccospheres and coccoliths.' — G. Wigglesworth, 'Rhizome of *Matonia*.' — F. F. Blackman & A. G. Tansley, 'Classification of Green Algæ' (cont.).

Nuovo Giorn. Bot. Ital. (July; received 18 Aug.). — G. Albo, 'Significato fisiologico degli alcaloidi vegetali.' — P. Reverdin, 'I peli delle Borraginacee.' — S. Sommier, 'Flora dell' Arcipelago Toscano.'—C. Zanfragnini, 'Flora lichenologica dell' Emilia.'

Oesterr. Bot. Zeitschrift (Aug.).—L. Graf von Sarnthein, 'J. von Schmidt-Wellenburg und dessen mykologische Thätigkeit.' — R. F. v. Benz, 'Hieracien-funde in den österreichischen Alpen' (concl.).—R. Häckel, 'Neue Gräser.'—J. Freyn, 'Plantæ Karoanæ' (cont.).

Rhodora (18 July). — R. E. D. Merrill, 'Notes on N. American Grasses.' — M. L. Fernald, *Empetrum rubrum* in New England.— (Aug.). M. L. Fernald, '*Taraxacum palustre* in America.' — G. E. Davenport, 'New England Ferns.'

BOOK-NOTES, NEWS, &c.

The *Journal of the College of Science* of the Imperial University, Tokyo (vol. xvi. part 2, 1902), contains a valuable addition to our knowledge of Japanese *Corallinæ*. The author, K. Yendo, has collected specimens of *Corallinaceæ* along the coast of northern and middle Japan. The *Melobesiæ* he sent to Mr. Foslie for identification, and, having worked out the *Corallinæ* himself, he publishes the results in this paper. In the preparation of the material for examination Mr. Yendo used either Perenyi's fluid, or, where more delicate treatment was required, acetic-sublimate or Flemming's fluid. For staining, Böhmer's hæmatoxylin was used for twenty to forty minutes, and then fuchsin (0·3 gr. in 100 cc. 50 per cent. alcohol) for one hour. The method of decalcifying, fixing, and staining at the same time with Schneider's aceto-carmin, and afterwards of staining with Böhmer's hæmatoxylin, was also employed. Thirty-two species are recorded, of which twenty are new. There are eight species of *Amphiroa*, three of *Cheilosporum*, and nine of *Corallina*. Two of these new species possess a variety each, and two new varieties are added to already existing species. A new definition of *Corallina adhærens* Kütz. is given, in order to distinguish from it the author's new species *C. decussato-dichotoma*, which is considered by him worthy of specific rank on account of certain stable characters, notwithstanding its resemblance to *C. adhærens*. The locality where each species was found is stated. A list of the literature referred to in the paper and an index follow the systematic treatment. There are seven large plates, showing both habit and structure of the plants described. Four

of them contain excellent reproductions of life-size photographs of the specimens, and these, together with the text, should be a great assistance in naming Japanese *Corallinæ*.—E. S. G.

The recently issued part (published in July) of *The Essex Naturalist* contains an interesting paper on "The Coming of Age of the Essex Field Club," by Prof. Meldola, in which the by no means inconsiderable work of the Club since its establishment is passed under review. Mr. Massee records *Agaricus citrinus*, new to Britain, from Epping Forest; Dr. M. C. Cooke publishes some corrigenda to his *Illustrations of British Fungi*, which we propose to reprint, should space allow; Mr. C. G. Britton has a paper on *Orchis maculata* subspecies *ericetorum*, which appears to be the common form in Epping Forest. He reprints Mr. E. F. Linton's description of this form (which was quoted in this Journal for 1890, p. 362), and adds: "There can be no doubt that of the characters ascribed to *O. ericetorum*, some are of questionable value. Thus, some of the Epping Forest plants possess a pleasant odour; the bracts and stems are more frequently green than purplish, and though some plants show the lip with the outer line of purple markings complete, these are in the minority. The characters which to me seem most helpful in determining *O. ericetorum*, are the narrow leaves, small spike of pale flowers, mid-lobe of lip smaller than the lateral, general slender habit, and its heathland habitat. Typical *O. maculata*, whilst it may be present in the Forest, I have not encountered, and, on the open heathy parts, *O. ericetorum* seems to be the only form present."

An instructive paper on the geographical distribution and natural grouping of the species of the genus *Bryum* which occur in Bohemia is published by J. Podpěra in the *Beihefte zum Botanischen Centralblatt*, xii. 1902, pp. 1–33. The two subgenera *Cladodium* and *Eubryum* are respectively northern and southern in their main distribution. *Cladodium* reaches its greatest variability in the Baltic region, and *Eubryum* in the Mediterranean region. Of some fifty species of *Cladodium* recorded for Europe, thirty-eight are exclusively northern, and nine are confined to the Alps. There are but five that occur in Bohemia, and they are well-characterized plants. *Eubryum*, on the other hand, is richly represented in Bohemia, and shows great variability. Some six dozen species have been recorded for Europe. Twenty of these have no special distributional limits. Twelve—one-sixth of the total—are purely boreal, whereas thirty-six attain their highest development in the Mediterranean region. The author offers some critical remarks upon the groups into which the species range themselves by their natural affinities, marshals them in a synoptical table, adds an artificial key, and then deals with them species by species, discussing their variability and their distribution in Bohemia. The paper should prove interesting to bryologists in our own islands.—A. G.

Prof. N. C. Kindberg begins a monograph of the genus *Thamnium* in the current number of *Hedwigia* (xli. 4, pp. 203–224). He enlarges the genus immensely, and merges into it the whole of

Porotrichum and numerous species from various other genera. In all, he includes ninety-six species, and treats of twenty of these in the present contribution. Many previous species he suppresses as mere synonyms. In an introduction he gives the history of the genus, and tabulates the characteristics which he finds to be, or not to be, trustworthy for the discrimination of the species, and supplies a bibliography. He employs four subgenera—*Eu-Thamnium*, *Porotrichum*, *Camptolepis*, and *Lembophyllum*—and divides the first three of these into *Leiophylla* and *Trachyphylla*, and then by subsequent subdivisions reduces the groups of species to conveniently small dimensions. Our two British species *T. alopecuroides* and *T. angustifolium*, the former common to three continents, and the latter very rare and confined to Derbyshire, appear on pp. 214 and 221 respectively.—A. G.

We are glad to note that Prof. Percival's excellent manual of *Agricultural Botany* (Duckworth & Co.; price 7s. 6d.), which was noticed in this Journal for 1900, p. 395, has reached a second edition. The fact that a new edition has so soon been called for is sufficient evidence that it supplied a want; the present issue "has been emended and revised throughout in accordance with recent work."

The recent part of Mr. J. M. Wood's *Natal Plants* finishes the third volume, to which an index and preliminaries are supplied; the second volume will shortly be completed. The plates in this instalment show an advance on those of previous issues, but we could wish that the species selected for figuring were of greater botanical interest, although doubtless Mr. Wood has reason for his choice. The literary portion might be improved, and some of the notes—*e. g.* that on the nomenclature of *Coccinia* (misspelt *Coccinea*) —might have been omitted without detriment to the value of the work.

The *Pharmaceutical Journal* for Aug. 16 contains the presidential address on the botany and botanists of Scotland, delivered by Mr. G. C. Druce at the Annual Meeting of the British Pharmaceutical Conference held at Dundee on Aug. 12.

A monograph of the genus *Œnothera* (or "Onothera," as the author prefers to call it) has been published at Le Mans by the Abbé H. Léveillé, with the collaboration in the anatomical portion of M. Ch. Guffroy. It is illustrated with not very satisfactory reproductions of photographs, as well as by anatomical details, and seems a careful piece of work, though somewhat dear at 100 francs.

We have received Part i., containing the Pteridophyta, Gymnosperms, and Monocotyledons, of the *Flora Arctica*, edited by Dr. C. H. Ostenfeld, and published by the Carlsberg Fund at Copenhagen. We hope to notice it in an early issue.

The Report of the Distributor for 1901 (Rev. E. S. Marshall) of the Botanical Exchange Club was issued on Aug. 2.

The control of the Royal Gardens, Kew, has been transferred from the Office of Works to the Board of Agriculture.

Aberdeen (Peterhead); Elgin (Lossiemouth); Orkney Islands; Argyle (Southend, Kintyre); Bute (Isles of Arran and Cumbrae); Ayr (Saltcoats). N. and W. coasts of Ireland (Antrim, Cork). Channel Islands (Guernsey, Alderney). Abundant, but rather local.

Fam. Cutleriaceæ Thur.

Gen. 129. Zanardinia Nardo.

Z. collaris Crn. (= *Zonaria collaris* Ag.). Coasts of Jersey (Grouville and St. Catherine's Bays) and Guernsey (Varzon Bay). Very rare.

Gen. 130. Cutleria Grev.

C. multifida Grev. Coasts of Cornwall (Gyllingvase, Falmouth, St. Mawes); Devon (Plymouth, Torquay, Exmouth, Sidmouth, Salcombe, Seaton); Dorset (Weymouth, Swanage, Studland); Sussex (Bognor, Brighton); Essex (Harwich); Suffolk (Felixstowe); Norfolk (Yarmouth); Cheshire (Hilbre Island); Isle of Man. Wales: Anglesea (Puffin Island). Scotland: Orkney Islands (Kirkwall Bay); Argyle (Loch Fyne); Bute (Isles of Arran and Cumbrae). Ireland: Bantry Bay and Ballycotton, Co. Cork; Wicklow; Roundstone Bay, Co. Galway; Kilkee, Co. Clare. Rare.—*β angustifrons* Holm. & Batt. Coasts of Devon (Torquay, Sidmouth); Dorset (Weymouth); Orkney (Kirkwall). Rare.

Asexual form (Aglaozonia Zan.).

A. reptans Crn. (= *Zonaria parvula* Grev.). Coasts of Cornwall (Trevone, St. Minver, Penzance, St. Michael's Mount, Falmouth, Fowey); Devon (Sidmouth); Sussex (Bognor); Northumberland (Berwick). Wales: Carnarvon (Swillies). Scotland: Argyle (Loch Fyne); Bute (Isles of Cumbrae and Arran). Ireland: Portaferry and Strangford Lough, Co. Down, and Miltown Malbay, Co. Clare. Channel Islands (Jersey, Guernsey). Not uncommon.

Suborder Fucineæ.

Fam. Fucaceæ J. Ag.

Gen. 131. Fucus Dcne. & Thur.

F. anceps Harv. & Ward. Coast of Clare (Kilkee). Very rare.

F. distichus L. "Only one specimen found. Cast ashore at Port Seton (J. R. Henderson, 1882)." So far as I am aware, the claim of this species to be regarded as a British alga rests entirely on the passage quoted above from the late Mr. G. W. Traill's *Monograph of the Algæ of the Firth of Forth*, p. 11.

F. ceranoides L. Coasts of Cornwall (Falmouth, Fowey); Devon (Estuary of the Dart); Dorset (Swanage, Studland, Poole); Hants (Isle of Wight); Sussex (Shoreham, Brighton); Essex (Blackwater Estuary); Norfolk (Yarmouth); Yorks. (Filey); Durham (Mouth of the Wear, Sunderland); Northumberland (Cullercoats, Tweed Estuary); Cheshire (Hilbre Island). Wales: Anglesea (Llangwyfan); Carnarvon (Bangor, Mouth of Cegin), Scotland: Haddington (Dunbar); Aberdeen; Orkney Islands; Argyle (Oban, Loch Long, Loch Fyne, Loch Goil, Aros, Isle of Mull); Bute (Isles of Cumbrae

and Arran); Renfrew (Greenock). Ireland: Larne, near Belfast; Wicklow; Bantry Bay, &c. Not uncommon in places where fresh water enters the sea.—*β Harveyanus* Kjellm. Alg. Arct. Sea, p. 201. Berwick, July, 1895, E. A. B. Bantry Bay, Co. Cork, May, 1898, E. George. — *γ linearis* Batt. (= *F. linearis* Huds. Fl. Angl. p. 467 (1762), non Fl. Dan.; *F. distichus* Lightfoot, non L.; *F. ceranoides* vars. *divergens* et *lacustris* Kjellm.). Orkney Islands (Loch of Stennis). Very rare.

F. spiralis L. (= *F. Areschougii* Kjellm.). Coasts of Cornwall (Fowey, Falmouth); Devon (Torquay, Sidmouth); Dorset (Weymouth, Swanage); Sussex (Bognor, Brighton); Essex (Fambridge Ferry; Estuaries of the Blackwater, Orwell, and Stour); Northumberland (Bamborough, Holy Island, Berwick). Scotland: Edinburgh (Leith, Newhaven); Orkney Islands (Kirkwall). Common. —Var. *volubilis* Batt. (= *F. volubilis* Huds. Fl. Angl. ed. 2, p. 577 (1778), e spec. auth. in herb. Brit. Mus.). Coasts of Essex (Fambridge Ferry, Maldon) and Norfolk (Wells). Rare.—Var. *platycarpus* (= *F. platycarpus* Thur.). Coasts of Cornwall (Penzance, Fowey River); Devon (Torquay, Plymouth); Hants (Isle of Wight); Essex (Fambridge Ferry); Northumberland (Berwick); Cheshire (Hilbre Island). Wales: Flints (Point of Ayr); Anglesea (Puffin Island). Scotland: Haddington (Dunbar, North Berwick); Edinburgh (Joppa); Fife (Elie, Earlsferry, &c.); Orkney Islands (Kirkwall); Argyle (Oban); Bute (Isles of Cumbrae and Bute); Dumbarton (Gare Loch). Not uncommon. — Var. *nanus* Stackh. Ner. Br. ed. 2, pl. v. (= *Halidrys nana* Stackh. Ner. Br. ed. 2, p. xi; *F. limitaneus* Auct.; *F. vesiculosus* var. *nanus* Batt. in Hauck & Richter, Phyk. Univ. no. 263). Coast of Northumberland (Berwick). Rare.

F. vesiculosus L. Coasts of Cornwall, Devon, Dorset, Hants, Sussex, Kent, Essex, Suffolk, Norfolk, Yorks., Durham, Northumberland, and Cheshire. Wales. Scotland, Ireland, and Channel Islands. Common and abundant. — Var. *divaricatus* Good. & Woodw. Coasts of Hants (Southampton) and Sussex (Worthing). Probably not uncommon. — Var. *angustifolius* Turn. (non *F. angustifolius* Wither.). Coasts of Devon (Plymouth); Sussex (Brighton, Worthing); Northumberland (Berwick). Rather rare. — Var. *balticus* J. Ag. (var. *subecostatus* Ag.). Coasts of Essex (Blackwater Estuary); Northumberland (Berwick); Argyle (Dunstaffnage Castle, Firth of Lorne, Isle of Kerrera); Renfrew (Gourock, Wemyss Bay); Bute (Isles of Arran, Cumbrae, and Bute). Ireland: Roundstone Bay, Co. Galway; Baldoyle. Rare. — Var. *laterifructus* Grev. Coasts of Devon (Plymouth); Northumberland (Berwick); Bute (Isles of Bute and Cumbrae, &c.). Common.— Var. *sphærocarpus* J. Ag. Coasts of Devon, Cornwall, Northumberland, &c. Not uncommon. — Var. *vadorum* Aresch. Coast of Devon (Plymouth, Sidmouth). Rather rare.

F. serratus L. Coasts of Cornwall, Devon, Dorset, Hants, Sussex, Kent, Essex, Suffolk, Norfolk, Yorks., Durham, Northumberland, Cheshire, Wales, Scotland, Ireland, Channel Islands. Common and abundant on most of the rocky parts of the British

coast.—Var. *angustifrons* Stackh. Coasts of Cornwall, Devon, Dorset, &c. Common. — Var. *latifolius* Turn. Coasts of Bute, Argyle (Oban), and the Orkney Islands (Kirkwall Bay, Damsay Bay). Very rare. — Var. *integer* Turn. (= *F. angustifolius* Wither. pro parte). Coasts of Cornwall (St. Ives); Devon (Sidmouth); Sussex (Brighton). Very rare. — Var. *laciniatus* Grev. Coast of Bute. Very rare.

Gen. 132. Ascophyllum Stackh.

A. nodosum Le Jol. Coasts of Cornwall, Devon, Dorset, Hants, Sussex, Kent, Essex, Suffolk, Norfolk, Yorks., Durham, Northumberland, Cheshire, Wales, Scotland, Ireland, and Channel Islands. Common and abundant on all the rocky parts of the British coast. — *β minor* Turn. Coast of Hants (Portsmouth).— *γ siliquatus* Turn. Coast of Kent (Dover). Rare. — *δ scopioides* Hauck. Coast of Essex (Blackwater Estuary, near Maldon). Rare.

A. Mackaii Holm. & Batt. (= *Fucus Mackaii* Turn.). Coasts of Scotland: Sutherland (Loch Coul and Kyle Scough); Ross (Loch Duich); Inverness (Arisaig, Isle of Skye); Hebrides (Loch Seaforth). Ireland: Birterbuy Bay, Co. Galway. Very rare. — *β Robertsoni* Batt. Loch Ranza, Isle of Arran. Very rare.

Gen. 133. Pelvetia Dcne. & Thur.

P. canaliculata Dcne. & Thur. (= *Fucus canaliculatus* L.). Coasts of Cornwall, Devon, Dorset, Hants, Sussex, Kent, Norfolk, Yorks., Durham, Northumberland, Cheshire, Isle of Man, Wales, Scotland, Ireland, and Channel Islands. Common and abundant on most of the rocky parts of the British coasts.

Gen. 134. Bifurcaria Stackh.

B. tuberculata Stackh. (= *Pycnophycus tuberculatus* Kütz.). Coasts of Cornwall (Boscastle, St. Minver, Padstow, St. Ives, Mousehole, Lizard, St. Michael's Mount, Falmouth, Fowey, Looe); Devon (Plymouth, Bovisand, Wembury, Ilfracombe); Dorset (Portland); Hants (Isle of Wight); [Norfolk (Cromer). Scotland: Bute (Isle of Arran)]. Ireland: North and west coasts (Roundstone Bay, Co. Galway; Miltown Malbay and Kilkee, Co. Clare; Bantry Bay, Co. Cork). Channel Islands (Jersey, Guernsey, Alderney). Rare. On the shores of the British Islands only met with on the coast of Southern England, the Channel Islands, and N. and W. Ireland. (N.B.—The Scotch locality given above rests on the rather doubtful authority of Mahoney's *List of Clydesdale Algæ*, the Norfolk one on Geldart's *List of Norfolk Algæ*; it is probable that some other plant has been mistaken for the present in both instances.)

Gen. 135. Himanthalia Lyngb.

H. lorea Lyngb. Coasts of Cornwall, Devon, Dorset, Hants, Sussex, Kent, Essex, Suffolk, Norfolk, Yorks., Northumberland, Isle of Man, Wales, Scotland, Ireland, and Channel Islands. Common on the rocky shores of the British Islands.

Gen. 136. Halidrys Lyngb.

H. siliquosa Lyngb. Coasts of Cornwall, Devon, Dorset, Hants, Sussex, Kent, Essex (Harwich), Suffolk (Felixstowe), Norfolk (Cromer), Yorks., Durham, Northumberland, Cheshire (Hilbre Island), Isle of Man, Wales, Scotland, Ireland, and Channel Islands. Common on the rocky shores of the British Islands.—*β siliculosus* (= *H. siliculosus* Stackh.; *H. siliquosa β minor* Turn. et var. *gracilis* Holm. & Batt.). Coasts of Cornwall (Polkerris, near Fowey); Devon (Torquay, Sidmouth); Dorset (Swanage); Northumberland (Berwick); Bute (Cumbrae). Probably not uncommon.

Gen. 137. Cystoseira Ag.

C. ericoides Ag. Coasts of Cornwall (St. Minver, Padstow, Mount's Bay, Falmouth, Looe); Devon (Plymouth, Torbay, Teignmouth, Sidmouth, Salcombe, Ilfracombe); Dorset (Swanage); Hants (Isle of Wight); Norfolk (Yarmouth). Wales: Anglesea (Llanvælog). Scotland: Argyle (Macrihanish Bay); Bute (Isle of Cumbrae); Ayr (Ayrheads). Ireland: Bantry Bay, Co. Cork; Miltown Malbay and Kilkee, Co. Clare. Channel Islands (Jersey, Guernsey, Alderney). Not uncommon on the southern shores of England, and South and West of Ireland; very rare in Scotland.

C. granulata Ag. Coasts of Cornwall (St. Minver, Mount's Bay, Trevone Bay, Falmouth, Looe, Fowey); Devon (Torbay, Ilfracombe); Dorset (Weymouth); Hants (Isle of Wight); Sussex (Bognor, Brighton); Norfolk (Yarmouth). Wales: Anglesea (Aberffraw). Scotland: Ayr (Stevenston). Ireland: Bantry Bay and Youghal, Co. Cork; Larne and Portrush, Co. Antrim; Ardglass, Co. Down; Magilligan, Co. Derry. Channel Islands (Jersey, Guernsey, Alderney). Rather rare on the south coast of England, and the West and South of Ireland.

C. discors Ag. (= *C. fœniculacea* Grev.). Coasts of Cornwall (Padstow, St. Minver, Falmouth); Devon (Plymouth, Torbay, Ladran Bay, Sidmouth, Ilfracombe); Dorset (Weymouth); Hants (Isle of Wight); Sussex (Brighton); Kent (Dover, Folkestone); Norfolk (Yarmouth). Ireland: Bantry Bay, Co. Cork; Kilkee, Co. Clare; Roundstone, Co. Galway. Channel Islands (Jersey, Guernsey, Alderney). Rather rare on the south coast of England, and the South and West of Ireland.

C. fibrosa Ag. Coasts of Cornwall (St. Minver, Mount's Bay, Falmouth, Fowey, Looe); Devon (Plymouth, Torbay, Sidmouth, Ilfracombe); Dorset (Weymouth, Swanage); Hants (Isle of Wight); Sussex (Brighton, Selsea); Kent (Dover, Folkestone); Norfolk (Yarmouth); Yorks. Ireland: Portrush, Co. Antrim; Roundstone, Co. Galway; Kilkee, Co. Clare; Bantry, Co. Cork. Channel Islands (Jersey, Guernsey, Alderney). Not uncommon on the shores of Southern England, and Northern, Western, and Southern Ireland.

Suborder Tilopterideæ Thur.

Gen. 138. Tilopteris Kütz.

T. Mertensii Kütz. (= *Ectocarpus Mertensii* Harv.). Coasts of Cornwall (Marazion, Falmouth, Mount Edgcumbe); Devon (Ilfra-

combe, Plymouth, Torbay, Sidmouth, Salcombe); Dorset (Weymouth); Sussex (Bognor, Brighton); Norfolk (Yarmouth); Durham (Seaton Carew); Northumberland (Cullercoats). Scotland: Edinburgh (Joppa); Fife (Kinghorn, Kirkcaldy); Aberdeen (Peterhead); Orkney Islands (Skaill); Argyle (Toward); Bute (Isle of Cumbrae); Ayr (Saltcoats). Ireland: Bantry Bay and Cove of Cork; Howth and Malahide, Co. Dublin; Strangford Lough, Co. Down; Carrickfergus, Co. Antrim; Roundstone, Co. Galway. Channel Islands (Jersey, Guernsey). Rare, but widely distributed.

Gen. 139. Haplospora Kjellm.

H. globosa Kjellm. emend. Breb. (= *H. globosa* Kjellm. et *Scaphospora speciosa* Kjellm.). S.W. coast of Scotland: Bute (Isle of Cumbrae). Very rare.

Gen. 140. Achinetospora Born.

A. pusilla Born. (= *Ectocarpus pusillus* Harv.). Coasts of Cornwall (Land's End, St. Michael's Mount, Mount's Bay, Cawsand Bay); Devon (Ilfracombe, Plymouth, Paignton, Torquay, Teignmouth, Sidmouth, Firestone Bay); Dorset (Swanage); Sussex (Brighton). Scotland: Haddington (Dunbar); Bute (Isles of Arran and Cumbrae). Ireland: Helvick Point and Dungarvan Bay, Co. Waterford. Channel Islands (Guernsey). Rather rare. — *β crinita* Batt. (= *Ectocarpus crinitus* Carm.). Coast of Devon (Ilfracombe, Watermouth, Torbay, Firestone Bay). Scotland: Edinburgh (Joppa, Caroline Park); Aberdeen (Peterhead); Argyle (Appin); Bute (Isles of Arran and Cumbrae); Renfrew (Gourock); Ayr (Girvan); Shetland Isles. Rare.

Suborder Dictyoteæ Thur.

Fam. Dictyotaceæ J. Ag.

Gen. 141. Dictyota Lamour.

D. dichotoma Lamour. Coasts of Cornwall (St. Minver, Trevone, Scilly Islands, Mount's Bay, Falmouth, Fowey, Looe); Devon (Plymouth, Torbay, Teignmouth, Sidmouth); Dorset (Portland, Weymouth, Swanage); Hants (Isle of Wight); Sussex (Brighton); Essex (Walton); Suffolk (Felixstowe); Norfolk (Yarmouth, Cromer); Yorks. (Whitby); Northumberland (Cullercoats, Alnmouth). Isle of Man. Wales: Anglesea (Puffin Island); Carnarvon (Swillies). Scotland: Haddington (Dunbar); Edinburgh (Newhaven, Leith); Fife (Elie, Aberdour); Orkney (Kirkwall, Skaill); Argyle (Loch Etive, Forth of Lorne, Mull of Kintyre, Castle Toward); Bute (Isles of Cumbrae and Arran); Ayr (Ayrheads); Renfrew (Cloch). Ireland generally. Channel Islands (Jersey, Guernsey, Alderney). Common and abundant on the southern and western shores of England and Ireland; much less abundant, and local, on the east coast of England and of Scotland generally. — *β implexa* J. Ag. (= var. *intricata* Ag.). Coasts of Cornwall (St. Minver, Falmouth, Talland Bay); Devon (Torquay, Plymouth, Sidmouth); Dorset (Swanage); Hants (Isle of Wight); Anglesea (Puffin Island); Carnarvon (Criccieth); Orkney Islands (Kirkwall); Argyle (Castle Toward);

Dumfriesshire coast. Not uncommon. — *γ latifrons* Holm. & Batt. Coasts of Cornwall (Scilly Islands, Penzance, Falmouth); Devon (Plymouth, Torquay, Sidmouth); Dorset (Weymouth, Swanage); Orkney (Kirkwall). Ireland: Ballycastle, Co. Antrim. Channel Islands (Jersey). Not uncommon.

D. ligulata Kütz. Coasts of Devon (Torquay, Sidmouth) and Dorset (Charmouth, Lyme Regis). Rare.

Gen. 142. Taonia J. Ag.

T. atomaria J. Ag. Coasts of Somerset (Minehead); Cornwall (St. Minver, Mount's Bay); Devon (Ilfracombe, Plymouth, Torbay, Sidmouth); Dorset (Weymouth, Swanage); Hants (Isle of Wight); Sussex (Worthing, Brighton); Suffolk (Felixstowe, Corton and Gunton near Lowestoft); Norfolk (Yarmouth, Cromer). Wales: Anglesea; Carnarvon (Llandudno); Glamorgan (Worm's Head). Scotland: Edinburgh (Portobello). Ireland: Ballycotton, Co. Cork. Locally abundant on the southern and eastern shores of England; very rare on those of Scotland and Ireland.—*β divaricata* Holm. & Batt. Coasts of Cornwall, Devon, and Dorset. Rare.

Gen. 143. Padina Adans.

P. pavonia Gaillon. Coasts of Devon (Torbay, Shaldon, Exmouth, Sidmouth); Dorset (Weymouth, Lulworth Cove, Chapman's Pool, Swanage); Hants (Isle of Wight); Kent (Dover, Margate); Essex (Harwich); Lancashire (Isle of Walney). Channel Islands (Jersey, Guernsey). Locally abundant on the southern shores of England and the Channel Islands.

Gen. 144. Dictyopteris Lamour.

D. membranacea Batt. (= *Fucus membranaceus* Stackh. Ner. Br. fasc. 1, p. 13, pl. vi. (1795) e spec. auth. in Herb. Kew.; *F. polypodioides* Desfont. Fl. Atlantica, ii. p. 421 (1798), non Gmelin, Hist. Fuc. p. 186 (1768); *Haliseris polypodioides* Ag.). Coasts of Cornwall (St. Minver, Mount's Bay, St. Austell Bay); Devon (Plymouth, Thatcher Rock, Livermead, Torquay, Sidmouth, Ilfracombe); Hants (Puckaster Rock). Ireland: Roundstone Bay, Co. Galway; Quilty Strand and Miltown Malbay, Co. Clare; Youghal, Co. Cork. Channel Islands (Jersey, Guernsey). Rare. Confined to the south coast of England and the Channel Islands, and the south and west of Ireland.

Order FLORIDEÆ Lamour.

Suborder Porphyreæ Thur.

Fam. Porphyraceæ Thur.

Gen. 145. Conchocelis Batt.

C. rosea Batt. Coasts of Devon (Plymouth, Tor Cross, Sidmouth); Bute (Isle of Cumbrae). Ireland (Dublin Bay and Roundstone Bay). Probably not uncommon.

Gen. 146. Goniotrichum Kütz.

G. elegans Le Jol. (= *Bangia elegans* Chauv.). Coasts of Cornwall (St. Minver); Devon (Plymouth, Sidmouth); Dorset (Weymouth, Swanage); Sussex (Worthing); Northumberland (Berwick). Wales (Menai Straits). Scotland: Argyle (Loch Etive); Bute (Isle of Cumbrae). Ireland: Strangford Lough and Portaferry, Co. Down; Dungarvan Bay, Co. Waterford. Not uncommon.

G. ramosum Hauck (= *Hormospora ramosa* Thw.). Coasts of Dorset (Littlesea, near Studland) and Northumberland (Berwick). **Very rare.**

G. cervicornu Reinsch. Coast of Devon (Plymouth, March, 1897, A. Church).

Gen. 147. Neevia Batt.

N. repens Batt. Coast of Kent (Deal). Rare.

Gen. 148. Erythropeltis Schm.

E. discigera Schm. var. *Flustræ* Batt. Coasts of Cornwall (Scilly Isles) and Kent (Deal). Rare.

Gen. 149. Erythrotrichia Aresch.

E. carnea J. Ag. (= *Bangia ceramicola* Chauv.). Coasts of Cornwall (Penzance, Falmouth, Fowey, Looe); Devon (Torquay); Dorset (Weymouth, Swanage); Sussex (Pagham, Brighton); Yorks. (Scarborough); Northumberland (Scremerston, Berwick). Wales: Loughor, Glamorganshire. Scotland: Argyle (Appin); Bute (Isles of Arran and Cumbrae); Ayr (Portincross, Ardrossan). Ireland: Belfast Lough. Channel Islands (Jersey, Guernsey, Alderney). Rarely met with in any quantity. Isolated filaments common.

E. ciliaris Batt., non Thur. (= *Bangia ciliaris* Carm.). Coasts of Cornwall (Scilly Islands), Argyle (Appin), and Forfar (Arbroath). Very rare.

E. Bertholdii Batt. (= *E. ciliaris* Berth., non *Bangia ciliaris* Carm.). Coast of Cornwall (Scilly Islands, Falmouth, Helford). Ireland: Rathlin Island and Ballycastle, Co. Antrim. Very rare.

E. investiens Born. (= *Bangia ciliaris* Traill, Monogr. Alg. Firth Forth, p. 5; *Erythrotrichia Boryana* Batt. in Holm. Alg. Br. Rar. Exsicc. no. 182, pro parte, non Berth.). Coasts of Sussex (Eastbourne); Bute (Isle of Arran); Ayr (Saltcoats, Fairlie); Edinburgh (Joppa); Fife (Kilrenny). Very rare.

E. Boryana Berth. (= *Porphyra ciliaris* Crn.; *E. ciliaris* Thur.). Coasts of Cornwall (Scilly Islands); Devon (Plymouth); Sussex (Eastbourne); Kent (Folkestone). Very rare. — Var. *crispa* Batt. Scilly Islands (Tean, Samson, St. Mary). Very rare.

E. reflexa Thur. (= *Bangia reflexa* Crn.). Coast of Dorset (Portland, August, 1900, E. A. B.; Alderney, Sept. 1901, E. D. Marquand). Very rare.

E. Welwitschii Batt. (= *Cruoria Welwitschii* Rupr. Och. Tang. p. 332, tab. 18, fig. 1 (1847); *Callithamnion lepadicola* J. Ag. Spec. Alg. iii. p. 12 (1876); Welw. Phyc. Lus. no. 231). Coast of Dorset (Swanage); Channel Islands (Guernsey). Very rare.

Gen. 150. Bangia Lyngb.

B. fuscopurpurea Lyngb. Coasts of Cornwall (St. Minver, Trevone Bay, Mount's Bay, Mount Edgcumbe); Devon (Ilfracombe, Plymouth, Teignmouth); Dorset (Weymouth); Sussex (Brighton); Essex (Harwich); Suffolk (Felixstowe); Norfolk (Yarmouth); Yorks. (Scarborough); Durham (Sunderland, South Shields); Northumberland (Holy Island, Berwick). Wales: Anglesea (Puffin Island); Glamorgan (Dunraven Castle). Scotland: Haddington (Dunbar); Edinburgh (Joppa, Caroline Park); Fife (Burntisland, Inchkeith, Earlsferry); Argyle (Loch Etive); Bute (Isles of Arran, Cumbrae, and Bute); Renfrew (Gourock); Ayr (Portincross, Girvan). Ireland: Roundstone Bay, Bantry Bay, &c. Channel Islands (Jersey, Guernsey). Not uncommon. — *β crispa* Holm. & Batt. Coasts of Cornwall (St. Minver); Dorset (Swanage); Norfolk (Yarmouth). Rare. — *γ Lejolisii* Holm. & Batt. Coast of Devon (Teignmouth). Rare.

Gen. 151. Porphyra Ag.

Subgenus 1. Euporphyra Rosenv.

P. coccinea J. Ag. Coasts of Devon (Plymouth); Northumberland (Berwick); Orkney Islands (Kirkwall); Bute (Isle of Cumbrae). Very rare.

P. leucosticta Thur. Coasts of Cornwall (Scilly Islands, Falmouth, Mount Edgcumbe); Devon (Plymouth, Torquay, Sidmouth); Dorset (Weymouth, Swanage); Hants (Isle of Wight); Essex (Harwich); Suffolk (Felixstowe); Yorks. (Scarborough); Northumberland (Alnmouth, Holy Island, Scremerston, Berwick). Scotland: Haddington (Dunbar); Edinburgh (Joppa); Fife (Earlsferry); Forfar (Arbroath); Orkney Islands; Bute (Isles of Cumbrae and Bute); Ayr (Portincross). Ireland: Larne and Murlough Bay, Co. Antrim; Roundstone, Co. Galway. Channel Islands (Alderney). Common in spring and early summer.

P. linearis Grev. (= *P. vulgaris* Harv. Phyc. Br. Pl. ccxi. pro parte). Coasts of Cornwall (Pridmouth, Mount's Bay, Falmouth); Devon (Plymouth, Torbay, Sidmouth); Dorset (Weymouth, Swanage); Hants (Isle of Wight); Sussex (Brighton, Hastings); Essex (Southend); Norfolk (Yarmouth); Yorks. (Scarborough); Durham (Sunderland); Northumberland (Cullercoats, Alnmouth, Holy Island, Berwick). Scotland: Haddington (Dunbar); Edinburgh (Joppa); Fife (Elie, Earlsferry); Forfar (Arbroath); Kincardine (Stonehaven); Aberdeen (Peterhead); Orkney Islands (Skaill); Argyle (Kirn); Bute (Isles of Bute, Arran, and Cumbrae); Dumbarton (Helensburgh). Ireland: Belfast Lough, Co. Down; Roundstone, Co. Galway; Kilkee, Co. Clare. Channel Islands (Jersey, Guernsey, Alderney). Not uncommon.

P. umbilicalis Kütz. var. *laciniata* J. Ag. Coasts of Cornwall (St. Minver, Falmouth, Looe); Devon (Plymouth, Torbay, Sidmouth); Dorset (Weymouth, Swanage); Hants (Isle of Wight); Sussex (Brighton, Hastings, Eastbourne); Kent (Folkestone, Deal); Essex (Harwich); Suffolk (Felixstowe); Norfolk (Yarmouth);

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British and Foreign

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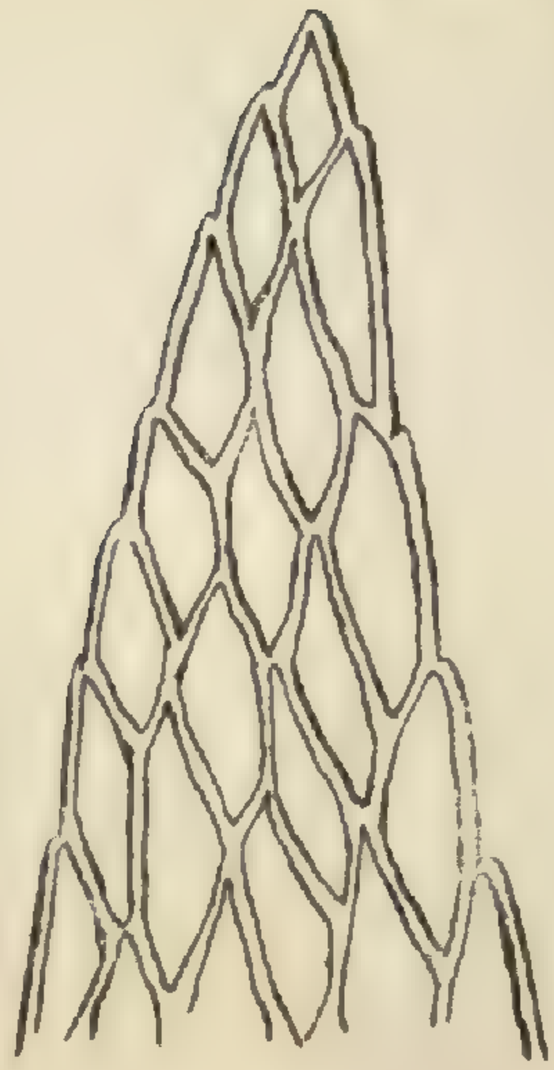

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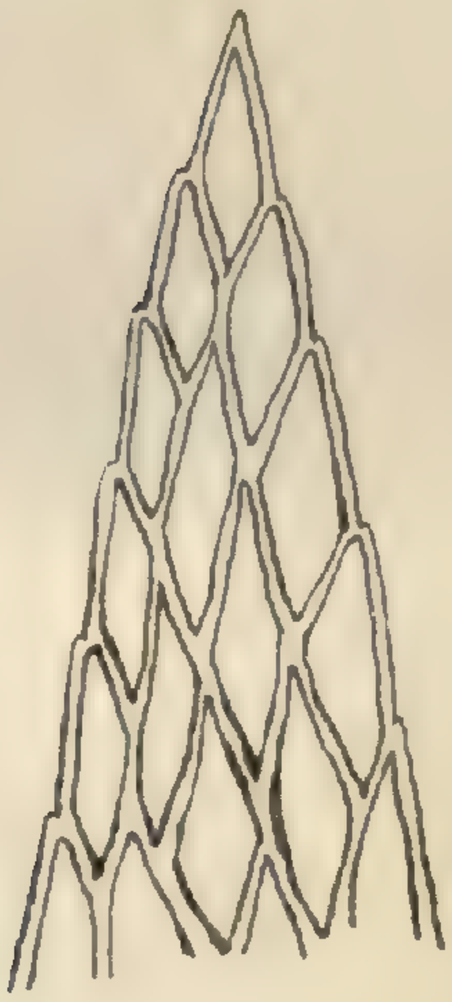

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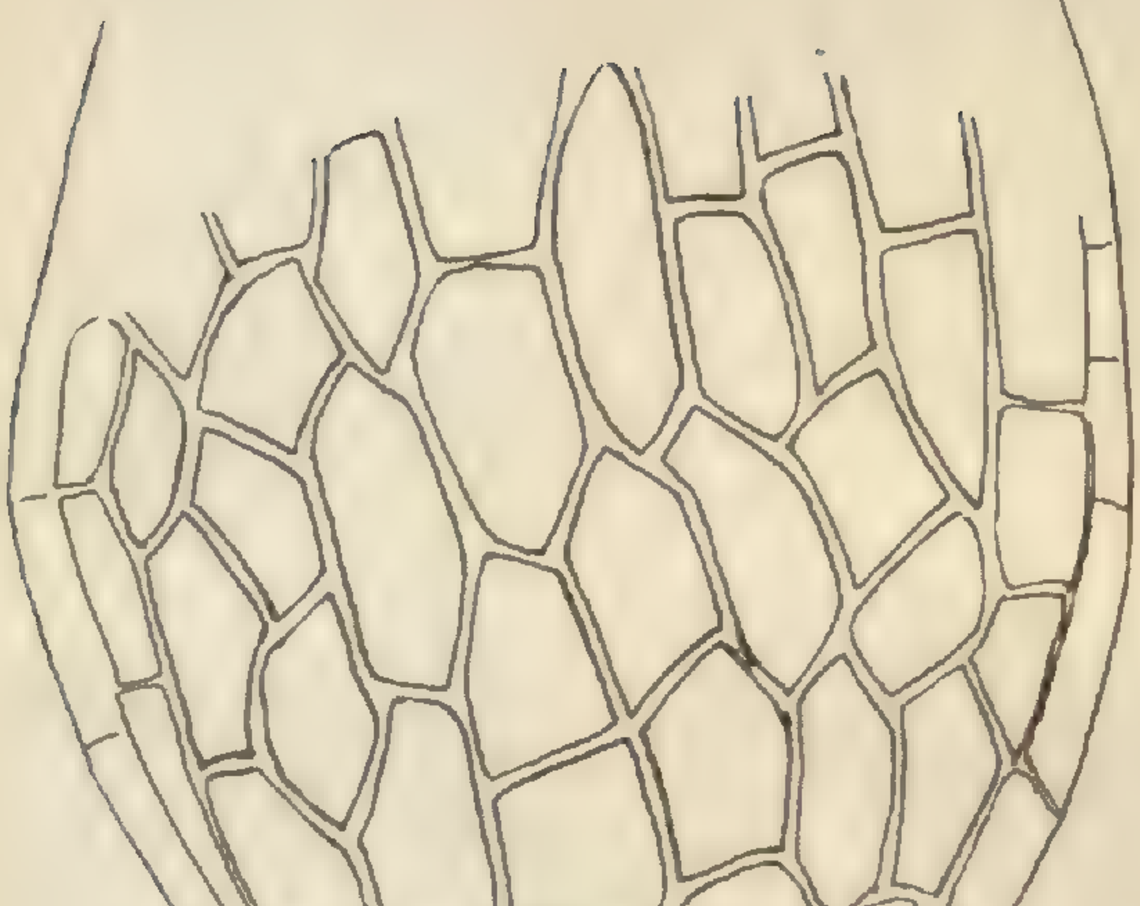

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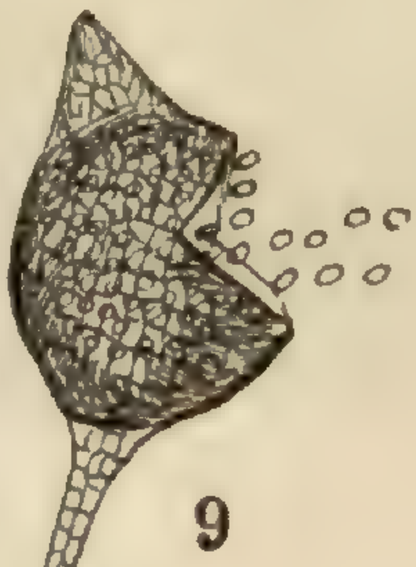

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W. E. Nicholson del.

West, Newman photo.

EPHEMERUM STELLATUM Philib.

EPHEMERUM STELLATUM IN BRITAIN.

By W. E. Nicholson.

(Plate 442.)

The sandy clay soil in the neighbourhood of Crowborough, in the north of the county of Sussex, is particularly rich in *Ephemera*, and I have already gathered there *E. serratum* Hpe. in abundance with the var. *angustifolia* Bry. Eur., *E. sessile* Rab. and the var. *brevifolium* Schp., and *Nanomitrium* (*Ephemerum*) *tenerum* Lindb. While searching for the above, last autumn, I came upon another form of these interesting little plants, which puzzled me considerably. It was growing in scattered plants on damp soil by the margin of a path on the outskirts of a plantation, and it is so minute and inconspicuous that, had I not accidentally caught sight of one of its orange-red capsules when looking for other mosses, it would no doubt have escaped me altogether. The general aspect of the plant from the shape and direction of the leaves suggested *E. sessile* var. *brevifolium*, but examination with a lens showed that the leaves were quite nerveless. On my return home I found that I had in my herbarium a few stems of the same moss from Bedgbury Woods, Kent, mounted in a micro-slide with a form of *E. serratum*, with which it was growing, without exhibiting any tendency to pass into that species. When I looked into the books at my disposal, I was much struck by the apparent resemblance of my plant to *E. stellatum* Philib., as described by Boulay (*Muscinées de la France*, p. 577), and Mr. Dixon, to whom I sent specimens, was inclined to share this view. The difficulty was to procure authentic specimens of *E. stellatum* for comparison, and here Mons. T. Husnot very kindly came to the rescue by sending me a few stems of the original plant. These stems were not quite fully developed, and were without capsules, but they agreed entirely with the smaller barren stems of the Crowborough plant. I also sent Mons. Husnot some specimens of the Crowborough plant, which he was good enough to examine and compare with the original material. His report was that my plant differed but little from *E. stellatum*, except possibly in the less stellate leaves and the calyptra, which appeared to him to be cucullate instead of campanulate, as in the late Prof. Philibert's plant. I have found, however, that in the smaller barren stems of the Crowborough plant the leaves are quite as stellate in arrangement as in the stems which Mons. Husnot sent me; and, with regard to the calyptra, that when uninjured it is campanulate, and the cucullate appearance noticed by Mons. Husnot was no doubt due to the fact that the mounted stems which I had sent him had been subjected to considerable pressure, which had split the calyptra on one side, giving it a cucullate appearance.

The following diagnosis is practically a translation of the original one given by the late Prof. Philibert in *La Revue Bryologique* for 1879, p. 63 :—

Prothallium branched, producing small simple and isolated plants; stem very short, furnished with about twenty leaves, which diverge in the form of a star, and thus give the species a peculiar appearance. The leaves are stiff, flat, and straight, and are thereby distinguished very clearly from those of *E. serratum*, which, on the contrary, are concave and incurved, so as to envelope the capsule. They are nerveless, entire or with only very small, scarcely visible teeth; while the leaves of *E. serratum* are serrate throughout, and, especially in the upper part, with large and very prominent teeth. The base of the leaves has an oval or rounded swelling, which is convex on both surfaces, and the swollen cells of which are filled with large opaque granules. This base is quickly contracted into a narrow elongate limb, which is regularly acuminate. In the swollen base the cells are very large, hexagonal, almost as broad as they are long; they become more elongate in the limb—from four to seven times as long as they are broad. The male and female flowers terminate distinct stems. The oval, orange, apiculate capsule is a little smaller than that of *E. serratum*, but of the same colour and general appearance. The calyptra is relatively larger, covering two-thirds of the capsule. Vaginula oval; seta distinct. Spores round, yellowish, smooth, up to ·045 mm. in diameter, not much more than half that of the spores of *E. serratum*.

Hab. Damp clayey earth of roads by the side of woods, Bruailles, Saône-et-Loire, France (Philibert). By the sides of roadways on a damp sandy clay soil in the Warren, Crowborough, Sussex, and Bedgbury Park Woods, Kent (W. E. N.).

Although related to *E. serratum*, the present species, which is perhaps the smallest of all British mosses, is distinguished from that species by its minute size, the peculiar stellate arrangement of the more numerous leaves (which is very marked in the smaller barren stems, though less so in the larger fertile plants), the shorter upper areolation, and especially by the very peculiar form and areolation of the leaf-base. The upper cells of the leaves are generally very markedly shorter than those of *E. serratum*, and only very rarely towards the middle of the leaf would the cells be seven times as long as broad, which is the extreme measurement given by Prof. Philibert. The larger calyptra, much smaller smooth spores, and the longer more distinct seta also form useful characters in distinguishing it. In speaking of the male and female flowers as terminating distinct stems, it would seem that Prof. Philibert was distinguishing the present plant from the synoicous *Ephemerum longifolium* Phib. (*Nanomitrium tenerum* Ldb.), which he discusses in the same article. I have found the male flowers on a small short stem near the base of the female flower, as in *E. serratum*.

EXPLANATION OF PLATE 442.

Ephemerum stellatum Philibert.—Fig. 1. Whole plant (Crowborough), × 30. 2. Leaf of same, × 30. 3. Areolation of leaf-apex of same, × 300. 4. Leaf of the Bruailles plant, × 30. 5. Areolation of the leaf-apex of same, × 300. 6. Areolation of the leaf-base (Crowborough), × 300. 7. Calyptra of same, × 30. 8. Capsule of same. 9. Capsule burst and emitting spores (Bedgbury), × 30. 10. Spores of the same, × 300. 11. Spore of *E. serratum* (Crowborough), × 300.

MR. T. KÄSSNER'S BRITISH EAST AFRICAN PLANTS.

The plants described or referred to in the following pages form part of a collection made during the last few months in British East Africa, and distributed at the National Herbarium. Some of the localities are near the coast; others, such as Kibwezi, further inland, and on or near the new railroad, of which Mr. Kässner would seem to have taken full advantage. There are a fair number of novelties in the collection, perhaps more than might have been expected, considering how many zealous people have already botanized in that part of Africa.

No attempt at a full catalogue is here made, a place having been found in it only for such things as seemed worthy on account of rareness or novelty. It is hoped to print other notices of the collection as the various parts of it are worked out.

Compositæ.

By Spencer Moore, F.L.S.

Gutenbergia pembensis, sp. nov. Ramulis gracilibus appresse pubescentibus dein glabris, foliis caulinis parvis sessilibus lanceolato-oblongis obtuse acutis basi cordatis amplexicaulibus integris vel summum leviter undulatis supra scabriusculis in sicco fuscis subtus appresse albo-sericeo-tomentosis, cymis laxis paucicapitulatis folia multoties excedentibus, pedicellis sæpissime capitula magnopere superantibus gracilibus pubescentibus, capitulis parvis pluriflosculosis, involucri 4-seriati pubescentis phyllis extimis lineari-lanceolatis reliquis lanceolatis omnibus longiuscule necnon rigidiuscule acuminatis interioribus marginibus breviter albo- vel dilutissime puniceo-membranaceis, achæniis minimis cylindrico-pentagonis pubescentibus 5-costatis.

Hab. Pemba River. No. 366.

Folia radicalia ignota; caulina 1·0–2·0 cm. long., 0·5–0·7 cm. lat., horum nervi supra impressi subtus eminentes. Cymæ circa 4·0–7·0 cm. long., et totidem lat., pubescentes. Pedicelli 1·0–4·5 cm. long. Capitula 0·8 cm. diam. Involucri phylla extima 0·3 cm., interiora 0·5 cm. long.: hæc circa 0·15 cm. lat., marginibus microscopice serrulatis. Corollæ puberulæ in toto 0·6 cm. long. tubus deorsum attenuatus sursum gradatim dilatatus; lobi lineari-lanceolati, acuti, 0·22 cm. long. Achænia vix 0·15 cm. long., 0·1 cm. diam., fusca.

The five ribs on the achene are so strongly pronounced as to make the achene pentagonal.

Known by the small amplexicaul leaves, the small heads, acuminate involucral leaves, and small pentagonal 5-costate hairy achenes.

Erlangea brachycalyx S. Moore. Makindo River. No. 594.
E. calycina S. Moore. Kiu. No. 665.
Vernonia zanzibarensis Less. Schimba Mt. Nos. 168, 202.
V. pauciflora Less. Makindo River, 3200 ft. No. 549.

V. senegalensis Less. var. *acuminata*, var. nov. Involucri phylla intermedia longe acuminata intima sæpius acuta. Schimba Mt. No. 201.

Vernonia (§ Stengelia) **Kaessneri,** sp. nov. Caule folioso valido subtereti in longitudinem striato velutino dein glabrescente, foliis petiolatis anguste ellipticis utrobique acutis impariter subgrosse serrato-dentatis supra puberulis subtus dense griseo-tomentosis, capitulis mediocribus multi flosculosis in paniculas corymbosas latas ac densas bracteatas terminales necnon folia bene excedentes digestis, pedunculis compressiusculis velutinis, bracteis parvis linearibus juxta capitulas brevipedicellatas insertis vel in involucrum transeuntibus, involucri 4-serialis puberuli phyllis extimis comparate parvis lineari-lanceolatis acutis phyllis intermediis lanceolato-oblongis intimis quam hæc longioribus lanceolatis et una cum his appendice brevi pallide brunnea vel virescente acuta obtusave coronatis, flosculis involucrum bene superantibus, corollæ tubo elongato angustissimo sursum sensim dilatato, achæniis abbreviatis subcylindricis pluristriatis basi callosis minutissime glanduloso-pubescentibus, pappi straminei setis pluriseriatis extimis abbreviatis intimis achænia multo excedentibus scabriusculis.

Hab. Simba River. No. 635.

Foliorum lamina 5·0–8·0 cm. long., 2·5–3·5 cm. lat.; petioli circa 1·0 cm. long., tomentosi. Pedunculi usque ad 10·0 cm., pedicelli plerumque 0·4–1·0 cm. long., hi griseo-tomentosi. Bracteæ circa 0·3 cm. long. Capitula 1·0 cm. long. et diam. Involucri phylla extima 0·2–0·3 cm., intermedia 0·5–0·7 cm., intima 0·8–0·9 cm. long., pallide straminea. Corollæ tubus 1·0 cm. long., juxta medium glandulis minutis onustus; limbi lobo modo 0·15 cm. long. Achænia 0·2 cm. et pappus 0·8 cm. long.

To be inserted next *V. masaiensis* S. Moore, from which it differs in the thickly tomentose under side of its leaves, much broader and longer-stalked panicles of heads, the compressed peduncles, somewhat different involucral leaves, long corollas, glandular achenes, &c.

Spharanthus Kirkii Oliv. & Hiern. Near Mariakani. No. 450.

Blepharispermum zanguebaricum Oliv. & Hiern. Kibwezi. No. 698.

Blepharispermum minus, sp. nov. Caule gracili angulato striato cinereo glabro, foliis parvis precipue ad basin ramulorum brevium capituligerorum e pulvino espinoso ortorum congestis obcordatis vel obovatis et tunc obtusissimis deorsum gradatim attenuatis brevipetiolatis puberulis chartaceis, capitulorum glomerulis solitariis sphæroideis, capitulis heterogamis 4-flosculosis flosculis exterioribus femineis interioribus hermaphroditis verisimiliter sterilibus, involucri phyllis 3 oblongis obovato-oblongisve acutis vel obtusis vel etiam obtusissimis sursum puberulis concavis carinatis, receptaculo communi abbreviato subhemisphærico, receptaculi partialis brevissimi paleis quam involucri phylla longioribus et angustioribus, flosculorum hermaph. corollis campanulato-tubulosis 5-lobis flosculorum fem. anguste tubulosis 3-lobis, achæniis fertilibus anguste obovato-oblongis compressis dorso prominenter carinatis marginibus hirsuto-ciliatis ceteroquin glabris, achæniorum

fertilium pappi squamis 2–3 lineari-lanceolatis ciliolatis corollas fere æquantibus adjectis paucis dorsalibus brevioribus, achæniorum sterilium squamis 5–10 inter se valde inæquilatis integris lacerisve quam corollæ brevioribus.

Hab. Taro, 1500 ped. No. 521.

Caulis 0·2–0·3 cm. diam. Foliorum lamina 0·7–1·2 cm. long., usque ad 1·0 cm. lat., in sicco pallescens; petioli 0·2–0·6 cm. long. Pedunculi 0·5–3·0 cm. long., rarissime 4·0 cm. attingentes, graciles, glabri, sæpe nutantes. Capitulorum glomeruli 1·0–1·3 cm. diam. Receptaculum commune summum 0·25 cm. long. Receptaculum partiale vix 0·1 cm. long. Involucri phylla 0·3–0·45 cm., receptaculi paleæ circa 0·5 cm. long. Flosculorum hermaph. corollæ 0·3 cm., flosculorum fem. 0·2 cm. long., illorum androecium bene exsertum necnon horum styli rami. Achænia fertilia adusque 0·3 cm. long. et 0·12 cm. lat., faciebus politis, ciliis albis rigidis, 0·1 cm. long. Achænia sterilia 0·2 cm. long. Achæniorum fert. pappi squamæ majores vix 0·2 cm. long., achæniorum ster. paullo ultra 0·2 cm. attingentes.

Distinguished by the habit, the small leaves and heads, the shorter corollas of the hermaphrodite florets, the narrow pappus-scales of the fertile achenes, &c.

Polycline psylloides Oliv. Sultan Hamoud. No. 660.

Wedelia abyssinica Vatke. Simba River. No. 634.

Aspilia Holstii O. Hoffm. Near Mazeras. Nos. 108, 285.

Crassocephalum notonioides, sp. nov. Glabrum caule ascendente folioso carnosulo valido, foliis ovato-oblongis acutis margine leviter undulatis basi in petiolum sat longum alatum gradatim desinentibus carnosulis in sicco viridibus, capitulis majusculis homogamis circa 80-flosculosis paucis ad apicem pedunculi terminalis folia excedentis raribracteati approximatis, pedunculis propriis bracteis parvis onustis, involucri omnino ecalyculati phyllis 10–13 stricte uniseriatis inter se inæquilatis linearibus vel lineari-oblongis acutis rigidulis dorso saltem in sicco striatulis marginibus hyalinis, receptaculo fimbrillifero, corollis involucrum haud superantibus intense aurantiacis, antheris basi integris, styli ramis appendice elongata coronatis.

Hab. Kibwezi. Nos. 718, 719 (also Mau, 7–8000 ft.; *G. F. Scott Elliot*. No. 6768).

Foliorum lamina 5·0–10·0 cm. long., 3·0–6·0 cm. lat.; petioli 4·0–5·0 cm. long. Pedunculus adusque 20·0 cm. long.; hujus bracteæ oblongo-lineares pleræque 3·0–4·0 cm. long. Pedunculi proprii 1·0–2·5 cm. long. Capitula paullo ultra 2·0 cm. long., 1·5 cm. diam. Involucri phylla 2·1 cm. long., latiora 0·5–0·6 cm. lat., angustiora 0·15–0·2 cm. Corollæ in toto 1·8 cm. long.; tubus deorsum angustus (0·03 cm. diam.), sursum ad 0·12 cm. dilatatus; lobi anguste lineari-lanceolati 0·5 cm. long. Styli rami 0·7 cm. long., cujus dimidium ad appendicem acutatam pubescentem pertinet. Achænia immatura anguste cylindrica, tenuiter costata, glabra, 0·2 cm. long. Pappi setæ albæ, scabriusculæ, 1·2 cm. long.

A remarkable plant which I am wholly unable to match or name from descriptions. The *Notonia*-like habit, the fleshy leaves, the

large heads, and the ecalyculate involucres very much like those of some *Othonna*, except that the leaves are quite free from each other —these are the most striking features of the species. The Scott Elliot specimen is incomplete, but should evidently be referred here.

Erythrocephalum minus Oliv. Near Muji Chunwi. No. 464.

Achyrothalamus marginatus O. Hoffm. Kili Makei. No. 613.

Sonchus Bipontini Aschers. var. Moa. No. 39.

Acanthaceæ.

By Spencer Moore, F.L.S.

Thunbergia affinis S. Moore, var. *pulvinata* S. Moore. Makindo River. No. 570.

T. Guerkeana Lindau (e descript.). Sultan Hamoud. No. 659. The specimen agrees very well with Dr. Lindau's description of this fine *Thunbergia*, except that the leaves are smaller.

Thunbergia (§ Eu-Thunbergia) **schimbensis**, sp. nov. Verisimiliter decumbens vel ascendens haud scandens, caule sat valido subtereti deinde angulato necnon minute striato hirto-pubescente, foliis petiolatis ovato-oblongis margine undulatis interdum basi unidentatis utrinque hirto-pubescentibus, floribus mediocribus subsessilibus paucis ramulos laterales folia subæquantes vel quam ea paullo longiores coronantibus et foliis imminutis quasibracteatis, bracteolis parvis oblongo-ovatis obtusis vel obtusissimis hirto-pubescentibus 5-nervibus, calycis dentibus 10 sat longis linearibus obtusis margine papillosis, corollæ verisimiliter albæ tubo sursum parum ampliato, antherarum loculis basi sagittatis obtusis, connectivo apice longe et acute producto, stigmatis lobis subæqualibus lobo inferiori deltoideo, capsula ignota.

Hab. Schimba Mountains. No. 174.

Foliorum lamina 2·0–3·5 cm. long., 1·3–2·0 cm. lat.; petioli 0·3–1·0 cm. long., hirti. Ramuli florigeri adusque 4·0 cm. long., sæpe vero breviores, pubescentes. Bracteolæ circa 1·0 cm. long. et 0·4 cm. lat., in longitudinem 7-nervosæ. Pedicelli circa 0·2 cm. long. Calyx 0·5 cm. long.; dentes flaccidi, 0·025 cm. lat. Corollæ tubus circa 2·0 cm. long., deorsum 0·35 cm. lat.; limbi circa 2·5 cm. diam. lobi rotundati. Antheræ vix 0·3 cm. long.; connectivus dorso puberulus. Discus puberulus, vix 0·1 cm. alt. Ovarium 0·3 cm. long., fere omnino glabrum; stylus paullo ultra 1·0 cm. long.; stigmatis lobus alter 0·1 cm. diam.

An ally of *T. Kirkiana* T. And., from which it may be told by reason of its shortly stalked not hastate leaves, subsessile flowers clustered few together at the end of short lateral branches, oblong-ovate obtuse not lanceolate-acuminate bracteoles, &c. *T. sessilis*, which it somewhat resembles, has, *inter alia*, sessile leaves and flowers, 3-nerved bracteoles, and much shorter glabrous calyx-teeth.

Ruellia meyachlamys S. Moore. Kibwezi. No. 703.

Dyschoriste Hildebrandtii S. Moore. Makindo. No. 541.

D. Fischeri Lindau. Near Daruma. No. 420.

D. thunbergiæflora Lindau. Mtoni River. No. 622.

Disperma kilimandsharicum C. B. Clarke. Makindo River. No. 555.

Barleria eranthemoides R. Br. Simba River. No. 641.
B. ramulosa C. B. Clarke. Near Maji Chunwi and Kibwezi. Nos. 465, 697.

Barleria (§ Eu-Barleria) **taitensis**, sp. nov. Caule folioso una cum foliis (præsertim in nervibus faciei inferioris) et bracteis et calycis lobis pilis fulvis stellatis simplicibus longioribus intermixtis tomentoso, foliis subsessilibus lanceolatis apice acutis et mucronatis chartaceis pag. sup. subfuscis et pilis utriusque generis pubescentibus, floribus in spicis brevibus plurifloris subcongestis ramulos terminantibus dispositis, bracteis oblanceolato-oblongis una cum bracteolis et calycis lobis majoribus apice parum recurvis necnon nigropungentibus, bracteolis anguste lineari-lanceolatis pubescentibus quam bracteæ paullo brevioribus, calycis lobis anticis alte connatis ambitu late obovatis lobum posticum lanceolato-ovatum sursum attenuatum amplectantibus, lobis lateralibus a reliquis longe superatis lineari-oblongis obtusis rigidis, corollæ bilabiatæ tubo cylindrico lobo antico reliquis subsimili ab iis breviter superato, filamentis deorsum piloso-puberulis, staminibus 4 quorum 2 cum minutis antheris polliniferis prædítis, ovula quove in loculo 2. *B. stellato-tomentosa* S. Moore, var. *ukambensis* Lindau. *B. salicifolia* C. B. Clarke *pro parte*, nec S. Moore.

Hab. Makindo River. No. 600.

Folia plerumque 4·0–5·0 cm. long., et 1·5–2·5 cm. lat.; nervi supra impressi subtus eminentes. Spicæ 3·0–5·0 cm. long. Bracteæ circa 1·7 cm. long., 0·4 cm. lat. Bracteolæ 1·4 cm. long., vix 0·2 cm. lat., marginibus hyalinis. Calycis intus politi et appresse puberuli et basi villosi lobi antici eleganter nervosi, paullo ultra 2·0 cm. long., 1·4 cm. lat., horum apices liberæ 0·25 cm. long.; lobus posticus 2·0 cm. long., deorsum 0·7 cm. lat.; laterales circa 1·0 cm. long. Corollæ extus puberulæ tubus vix 2·5 cm. long., 0·3 cm. diam., juxta basin leviter amplificatus, intus præsertim juxta staminum insertionem piliferus; limbi lobus anticus 2·0 × 1·1 cm., lobi reliqui 2·2 × 1·0 cm. Staminum majorum filamenta 3·0 cm, antheræ 0·42 cm. long.; minorum filamenta 0·12 cm. et antheræ 0·1 cm. long. Discus elevatus, in longitudinem rugosus, subbilabiatus, fere usque ad 0·2 cm. alt. Ovarium ovoideum, glabrum, 0·3 cm. long. Stylus basi puberulus, vix 4·5 cm. long.

Hildebrandt's Nos. 2722 and 2457 and a specimen at Kew collected by Lieut. C. S. Smith are to be referred here. Lindau described the former two as a var. of *B. stellato-tomentosa*, a species known to him only by description; but I do not think he would have done this had he been in a more favourable position. I am also unable to follow Mr. C. B. Clarke in removing them to *B. salicifolia*, although this is doubtless the affinity. *B. taitensis* differs from *B. stellato-tomentosa* in the smaller leaves, slenderer spikes, the narrower bracts remarkably attenuated in their upper part, the much narrower bracteoles considerably shorter than the calyx and finely pubescent instead of hirsute, the very broad anticous lobes of the calyx partly enfolding the posticous lobe, which is greatly narrowed in its upper two-fifths instead of being ovate-oblong and acute, the larger

corolla with its lobes narrower relatively to their length, the smaller anthers functional instead of being reduced to mere knobs, &c. *Inter alia* the leaves and bracts of *B. salicifolia* are different, the anticous sepals are quite differently shaped, the posticous sepal is spathulate, the lateral sepals twice as long, the corollas are like those of *B. stellato-tomentosa*, and the filaments of the smaller stamens are several times longer and their anthers very much reduced.

Var.? *occidentalis*. Calycis parvi lobis anticis angustioribus (1·7 × 1·0 cm.), lobo postico sursum minus attenuato, corolla insigniter breviori verisimiliter modo 1·5 cm. long., stylo omnino glabro, &c. *B. salicifolia* C. B. Clarke *pro parte*, nec S. Moore.

Hab. Angola; *Welwitsch*, No. 5119.

The Museum specimens of this have only a single flower, and for this reason, when working at my memoir on Welwitsch's *Acanthaceæ*, I declined to write a description. As shown above, the corolla is markedly smaller than is that of *B. taitensis*, and, when examined, may prove so different from it as, together with the other discrepancies already mentioned, will justify the separation of this western plant from the eastern *B. taitensis*. Moreover, Welwitsch notes that the flowers are deep blue: those of *B. taitensis* would appear to be either white or yellow.

Barleria submollis Lindau. Near Mazeras. No. 283. The specimens are exactly similar to those of Johnston distributed from Kew, and both sets agree with Lindau's description of his *B. submollis*. Mr. Clarke suppresses the species; but I am not prepared to acquiesce in this, for *B. Volkensii* Lindau, to which Johnston's specimens are referred in the *Flora of Tropical Africa*, seems to me a different plant.

Crabbea velutina S. Moore. Makindo River. No. 554.

C. reticulata C. B. Clarke. Kibwezi River. No. 682.

Neuracanthus scaber S. Moore. Makindo River. No. 608.

Crossandra subacaulis C. B. Clarke. Near Samburu and at Kili Makei. Nos. 481 & 616.

Pseuderanthemum Hildebrandtii Lindau. Kibwezi. No. 701. One of the specimens of this is somewhat off type, having a pubescent axis of inflorescence.

Asystasia parvula C. B. Clarke. Near Totohoro and near Bote. Nos. 61 & 69. In the *Flora of Tropical Africa* the capsule of this is said to be "less than ¼ in. long," where I suppose ¼ is a *lapsus calami* or printer's error, for this size is extremely short for the capsule of most *Acanthaceæ*. On measuring the capsule of the type at Kew, I find it to be ½ in. long, while that of Kässner's specimens is a line longer.

A. Charmian S. Moore. Kiu. No. 663. Both flowers and ripe capsules in excellent condition are here.

A. Schimperi T. And., var.? Kibwezi. No. 712. The leaves are very narrow. There are no flowers.

Ruttya fruticosa Lindau. Makindo. No. 540.

Justicia Emini Lindau. Taro. No. 497.

J. flava Vahl. Taro and Makindo River. Nos. 494 & 593.

J. longecalcarata Lindau. Makindo River. No. 589.
J. stachytarphetoides C. B. Clarke. Without number or locality.

Justicia (§ HARNIERA) **Kaessneri**, sp. nov. Ramulis verisimiliter ascendentibus geniculatis patule piloso-pubescentibus, foliis parvis oblongo-ovatis rarius oblongis obtusis deorsum in petiolum brevem breviter angustatis supra scabriusculis in sicco saturate viridibus subtus pallidioribus et præsertim in nervos puberulis, floribus parvis in axillis paucis nonnunquam solitariis, foliis floralibus parvis ovatis obtusissimis, bracteolis subulatis quam calyx brevioribus, calycis piloso-pubescentis lobis lineari-lanceolatis acutis a tubo corollæ breviter superatis, corollæ parvæ extus pubescentis verisimiliter albæ vel lutescentis tubo lato faucibus dilatatis labio postico ovato bifido labii antici lobo intermedio subquadrato quam lobi laterales oblongi manifeste latiore palato maxime eminente, antherarum loculo superiori basi calvo loc. inferiori quam superior paullo majore valide incurvo-calcarato, capsula modica appresse puberula heteromorpha puberula 4-alata alis breviter dentatis.

Hab. Gadu. No. 409.

Folia sæpissime 1·0–2·0 cm. long. et 0·5–1·0 cm. lat.; petioli 0·2–0·3 cm. long., pubescentes. Folia floralia sæpe 0·5 cm. long., vix totidem lat. Bracteolæ circa 0·15 cm. long. Calycis lobi paullo ultra 0·3 cm. long. Corollæ tubus 0·4 cm. long, deorsum fere 0·2 cm. faucibus circa 0·3 cm. lat.; labium posticum 0·35 cm. long., basi 0·3 cm. lat.; anticum paullulum longius et 0·4 cm. lat., lobi laterales 0·13 cm. long., 0·1 cm. lat. Antherarum loculus superior 0·1 cm. inferior 0·12 cm. long., hujus calcar 0·04 cm. long.; connectivus pilosus. Ovarium sursum attenuatum, 0·13 cm. long. Stylus 0·5 cm. long. Capsula heteromorpha 0·3 cm. long. et lat., 1-sperma. Semen circa 0·08 cm. diam., læte brunneum, microscopice glandulosum.

A near ally of this, and possibly referable to the same species, is Welwitsch No. 5117, named wrongly by me, as Mr. Clarke has shown, *Justicia insularis* T. And. But Clarke is himself in error in referring this specimen to my *Justicia Lazarus*, which belongs to § *Calophanoides*, whereas on Welwitsch's plant dimorphic capsules are very plainly to be seen, on the Museum specimen at least, so that it must come into § *Harniera*.

J. diclipteroides Lindau. Kiu. No. 669.
J. cordata T. And. Kibwezi. No. 702.

Var. *pubescens*, var. nov. Caule et ramulis et foliis et calycis lobis pubescentibus, alabastris densissime pubescentibus, corollæ labio postico breviter bilobo. Sultan Hamoud. No. 654.

J. interrupta C. B. Clarke (e descript.). Kibwezi. Nos. 684 & 694.
Adhatoda Schimperiana Hochst. Taro, 1800 ft. No. 522.
A. Engleriana C. B. Clarke. Duruma River. No. 295.
Ecbolium subcordatum C. B. Clarke. Taro. No. 498.
E. hamatum C. B. Clarke. Makindo River. No. 587.
E. trinervium C. B. Clarke? Makindo River. No. 599. There is, I believe, no specimen of this in the country. The description of *E. trinervium* (Fl. Afr. Trop. v. p. 239) fits Kässner's plant fairly

well, but its leaves are lanceolate and the bracts not very distinctly 3-nerved.

Hypoëstes verticillaris R. Br. Schimba Mt. and Simba River. Nos. 178 & 637.

H. antennifera S. Moore. Kibwezi. No. 695.

H. Hildebrandtii Lindau. Kibwezi. No. 713.

WEST LANCASHIRE PLANTS.

By J. A. Wheldon, F.L.S., and Albert Wilson, F.L.S.

The plants enumerated in the following pages are principally species discovered in West Lancashire since the publication of our previous lists in this Journal. Those which are presumably new county records are indicated by an asterisk. A few other species are included, either in confirmation of old records, or because their rarity in the vice-county renders the discovery of an additional station a matter of interest. Aliens and denizens have the obelisk sign prefixed.

We have to thank Mr. C. Bailey, F.L.S., Mr. H. Beesley, and the Rev. P. J. Hornby for information or specimens; and the records they have been good enough to supply are denoted by their respective initials—C. B., H. B., or P. J. H. We have also availed ourselves of a few items that were new to us in Mr. L. Petty's "Plants of Silverdale" (*Naturalist*, 1902, p. 33), quoted as L. P. Other contractions used are Wh. (Wheldon), and Wi. (Wilson).

Our thanks are also due to Messrs. Ar. Bennett, G. C. Druce, H. Groves, and the Rev. W. M. Rogers for much assistance in the determination of critical plants—some only of which are mentioned here. But the ready help we have invariably received from these and other busy specialists is gratefully appreciated, and will be fully acknowledged in our projected Flora of West Lancashire.

†*Anemone ranunculoides* L. Occurs as a denizen near Red Scar; P. J. H.

Ranunculus Drouettii Godr. Near Winmarleigh, June, 1900; Wh. & Wi.—*R. acer* L. Of the subspecies, as defined in Mr. Townsend's arrangement in Journ. Bot. 1900, p. 379, we find the following. —**R. Boreanus* Jord. Preesall; Wh. Lee, near Tarnbrook, Wi. & Wh.; and in many other localities. This appears to be our commonest segregate. — *Var. *tomophyllus* (Jord.). Near Abbeystead and Silverdale; Wh. — **R. rectus* Bor. Near Caton and Dolphinholme, Wh.; and elsewhere. — **R. vulgatus* Jord. Easegill, near Leek; Wi. & Wh.

**Caltha minor* Syme. Springs near the foot of Gavell's Clough, on the white side of Tarnbrook Fell, alt. 1150 ft., June, 1902; Wi. & Wh.

**Helleborus fœtidus* L. Gatebarrow Wood, near Silverdale, where it is perhaps native; Wi. Barton, near Preston; H. B.

*†*Barbarea præcox* R. Br. Garden weed at St. Michaels; P. J. H.

**Draba muralis* L. On limestone between Kirkby Lonsdale and Whittington, May, 1901; Wi.

*†*Erysimum perfoliatum* Crantz. Fleetwood and Preston Docks, sparingly; Wh.

†*Sisymbrium pannonicum* Jacq. Appears to be gradually extending its area in Lancashire. One or two additional stations for South Lancashire are recorded, and Mr. Charles Bailey has recently discovered it in a third West Lancashire locality near St. Annes.

*†*Lepidium ruderale* L. Near St. Annes, August, 1901; C. B.

*†*Claytonia sibirica* L. Well established near Eccleston Springs, Great Eccleston; P. J. H.

Hypericum dubium Leers. Elston Wood; Wh.

Viola carpatica Borbas. This has been found to occur in several localities in both our north and west districts, in addition to the Cockerham Moss habitat referred to by Mr. E. G. Baker (Journ. Bot. 1901, p. 10). It also occurs in the vicinity of some of the South Lancs (v.-c. 59) mosses.

*†*Saponaria Vaccaria* L. Fleetwood Docks. Two plants only, July, 1902; Wh.

Buda rubra Dum. Near Lancaster; Wi. By the canal, Glasson; Wh.

Genista anglica L. Bog near Docker, abundant; Wi.

**Ornithopus perpusillus* L. Moss Side, near St. Michaels-on-Wyre; P. J. H.

*†*Vicia pseudo-cracca*. A few plants have occurred about the Fleetwood Docks for the last year or two. Still there; Wh.

*†*Lupinus perennis* Auct. Angl. (*L. nootkatensis* Donn ?).—Plentiful on rail-banks between Salwick and Kirkham, extending at intervals for about a mile. First seen in 1899, and observed yearly since. It is usually cut down when flowering with the hay; Wh.

Rubus suberectus* And. Boggy thicket above Botton Mill, Hindburn, July, 1901; Wi.—R. pyramidalis* Kalt. Between Morecambe and Snatchems, July, 1899; Wh.—**R. mucronatus* Blox. Near Knott End, July, 1901; Wh. Mr. Rogers remarks: "Leaves somewhat intermediate between *R. cinerosus* and *R. mucronatus*; but, I suppose, going best under the latter, which is very variable." Plants referable to *R. mucronatus* occur in several other localities in the Fylde area. None of these latter could be confused with *R. cinerosus*. Good *R. cinerosus* grows not far from the Knott End locality for *R. mucronatus*, and it is quite likely that two such nearly allied forms would hybridize.

Potentilla verna L. Silverdale; Miss Beaver (L. P.). Mr. Beesley has kindly sent us specimens from a locality near Longridge, which affords an interesting confirmation of the unverified locality given by Ashfield: "Said to grow in dry pastures near Preston."

**Alchemilla vulgaris* L. var. *alpestris* (Schmidt). Easegill, June, 1901, and near Ireby; Wi. & Wh. Near Abbeystead; Rev. W. W. Mason & Wh. Our common form is var. *pratensis* Schmidt, and hitherto we have no certain record of the occurrence of var. *filicaulis* (Buser).

†*Sedum sexangulare* L. Garden escape near Silverdale; L. P.

**Myriophyllum alterniflorum* DC. In the River Lune between Kirkby Lonsdale and Tunstall, August, 1901, and near Arkholme; Wi.

**Circæa alpina* L. var. *intermedia* (Ehrh). Wood below White Moss, Hindburn, June, 1901; Wi.

Galium palustre (L.). A fine form occurs near Knott End, growing with *Rumex Hydrolapathum*, of which Mr. Ar. Bennett writes: "Your plant is more diffuse than any form of *palustre* I remember. It may be *β maximum* Marsson (but I have seen no specimen of it), who says, '*Caulibus 2–3-pedalis, foliis latioribus subpollicaribus.*" Wh.

*†*Bupleurum rotundifolium* L. Casually near Fleetwood grain elevator, July, 1902; Wh.

Œnanthe Phellandrium Lam. In a pit at Stockenbridge; P. J. H. Personal authority is lacking in *Topographical Botany*.

Aster Tripolium L. forma *discoidea*. Near Knott End; H. B.

**Arctium intermedium* Lange. Near Abbeystead, August, 1901, and about Alston; Wh. Several localities in Over Wyresdale, where it is frequent; Wh. & Wi. (Confirmed by Mr. Ar. Bennett.)

Hieracium sciaphilum Uechtr. Easegill; Leighton Beck, near Silverdale; Deer Clough, Wyresdale; and Tootel Heights; Wh. & Wi. —[*H. diaphanum* Fr. Longridge; E. F. Linton in Bot. Exch. Club Rep. vol. i. p. 396, and Journ. Bot. 1900, p. 44.] With reference to this, Mr. Linton writes: "The specimen was no doubt a weather-worn *H. vulgatum*, with the involucre denuded of hairs and down by a wet and smoky climate." This should therefore be deleted.] — *H. rigidum* Hartm. var. *tridentatum* (Fr.). Left bank of the Greeta near Wrayton; Wi.

**Statice Limonium* L. var. *pyramidalis* Syme. Saltmarsh at Preesall, Sept. 1899; Wh. In this locality also grow abundantly *S. occidentalis*, *S. Limonium*, and *S. rariflora*, and with them plants identical with those distributed by Mr. E. S. Marshall as *S. Limonium* × *rariflora*, which is referred by Mr. Bennett to *S. bahusiensis* var. *danica* Fr.

Trientalis europæa L. In addition to the locality for this plant in Black Clough, recorded in this Journal for Jan. 1901, we find it to extend abundantly on the adjacent fells from near Marshaw to the moor on the south-east of Blaze Moss.

†*Pulmonaria officinalis* L. Garden escape near Preston; H. B. And under similar circumstances between Warton and Yealand, Wh.; and near Docker, Wi.

†*Antirrhinum Orontium* L. Casual on rail-banks near Garstang; H. B.

Mentha gentilis L. By the Hodder near Mytton, Aug. 1899; Wh. (*teste* W. R. Linton).

**Salvia Verbenaca* L. Silverdale, June, 1901; L. P.

†*Beta vulgaris* L. Rail-bank near Silverdale, casually; Wi.

†*Amaranthus Blitum* L. On ballast, Preston Docks, Aug. 1900; Wh.

Rumex domesticus Hartm. By the Lune near Kirkby Lonsdale,

1901; Wh. & Wi. — *R. crispus* var. *trigranulatus* Syme. In great quantity on the Fleetwood Salt-marshes, July, 1901, from whence I distributed specimens last year; Wh. This plant is perhaps only an alien in Lancashire (?). It occurs at the mouth of tidal rivers, on ballast by canals, and in dock-yards, as at Birkenhead Docks, Cheshire; canal-banks, Ford, South Lancs, and other similar situations.

Salix phylicifolia L. By the Lune near Tunstall; Wi. — *S. nigricans* Sm. Bank of the Lune near Kirkby Lonsdale; Wi.

**Allium oleraceum* L. var. *complanatum* Fries. On the left bank of the Greeta near Wrayton, July, 1901; Wi.

**Potamogeton obtusifolius* M. & K. var. *fluvialis* Lange & Mortensen. Grimsargh Reservoir, near Preston, Aug. 1900; Wh. (*teste* Ar. Bennett). Mill-dam near Quernmore; Wi. & Wh.

**Scirpus Caricis* Retz. Left bank of the Greeta near Wrayton, Aug. 1901; Wi.

Carex teretiuscula* Good. Bog near Docker, June, 1901; Wh. & Wi.—C. rigida* Good. Greygarth Fell at 2000 ft.; Wi. Seen and confirmed by Mr. Ar. Bennett.—**C. hirta* L. var. *hirtæformis*. Bank of Wyre near Scorton, on shingle with *Mimulus Langsdorffii*, July, 1901; H. B., Wi. & Wh.

*†*Setaria viridis* Beauv. Wardless; H. B. — *†*S. glauca* Beauv. Ashton, Aug. 1900; H. B.

Agrostis palustris Huds. var. *coarctata* (Hoffm.). Near Preston, July, 1900; Wh. (*teste* Druce & Hackel).—Var. *pro-repens* Aschers. With the preceding on Preesall Marshes, July, 1900; Wh.

Avena pratensis L. Near Silverdale; L. P. — *†*A. fatua* L. Casual near Ribchester, Aug. 1900; Wh.

*†*Cynosurus echinatus* L. On ballast, Fleetwood Docks, July, 1902; Wh.

**Glyceria aquatica* L. Marton, 1899; H. B.

Festuca sciuroides* Roth. Moss Side, St. Michaels; P. J. H.—*F. sylvatica* Vill. Rocky wood by the Wyre above Dolphinholme; Wi.—F. elatior* × *Lolium perenne* Ingol and Cottam; H. B.

*†*Lolium temulentum* L. Winmarleigh; H. B.

Agropyron pungens Roem. & Schultes. Glasson, on sea-banks, Sept. 1900; Wh. (*teste* Druce & Hackel).

Hymenophyllum unilaterale Bory. This exceedingly rare West Lancs plant was found by the authors in two fresh localities this summer, one in the Udale, and the other in the Over Wyresdale district.

Athyrium Filix-fœmina Roth, var. *convexum* Newm. (*A. rhæticum* Roth). Wood near Quernmore, Aug. 1900; Wh. This we have since ascertained to be very frequent in the valleys of the fell districts.

Lastræa rigida Presl. It is satisfactory to be able to report this still in the Silverdale district. It was found in a new locality there this year (1902); Wi. — **L. dilatata* Presl. var. *nana* Newm. On high grit scars from 1250 to 1900 ft. alt. on Hell Crag, Long Crag, &c., Wyresdale; Wh. & Wi. On Greygarth Fell; Wi.

Selaginella selaginoides Gray. Springs near Damas Gill Head; Wi. & Wh.

**Chara aspera* Willd. Canal near Cabus, July, 1901; H. B., Wh. & Wi.

Tolypella glomerata Leonh. Canal near Lancaster, 1900; Wh. A *Tolypella* occurs in the canal near Cabus, but our material was not sufficient to enable Mr. Bennett to determine whether it should be referred to *T. glomerata* or *T. prolifera;* Wi. & Wh.

The following species, marked with an asterisk in Mr. C. E. Salmon's paper on page 293, *ante*, have been previously recorded:—

Sisymbrium Sophia appeared for the district in Jenkinson's *Descriptions of British Plants* as far back as 1775. We have confirmatory records from several localities.

Euphorbia Paralias and *Rumex maritimus* are both recorded by C. J. Ashfield in his *Flora of Preston*, circa 1864.

Carex curta, *C. distans*, and *Eriophorum vaginatum*, all very frequent West Lancs plants, were recorded by Mr. A. Wilson in the Bot. Rec. Club Report for 1881–2. *Carex curta* ascends from sea-level to 1450 ft. on Botton Head Fell.

SOME KENTISH PLANTS.

By G. Claridge Druce, M.A., F.L.S.

In 1899 I spent a few days at Dover during the meeting of the British Association, and was enabled to snatch a few hours for botanizing; more recently I visited the interesting district of Dungeness and New Romney under the guidance of Mrs. Davy. The great expanse of shingle which has accumulated in historic times on the coast of Sussex and Kent between Winchelsea and Dymchurch is a most remarkable feature in physical geography, which to the botanist offers much that is attractive, and especially to the student of plant œcology. Here one is able to see a flora in course of formation, and the curious manner in which the habit of plants becomes changed in order to accommodate themselves to new conditions.

The coast-line of this great expanse of shingle is not a definite one, for at one portion, as at Dungeness lighthouse, the shingle is making its way seaward at the rate of about four feet a year; in other places it is receding; but the whole deposit is of such great area, and is so flat, that one is able to trace the old coast-line for many miles. Much of the ground which has been reclaimed from the sea is cultivated, and its arable soil give some of the heaviest corn crops in Kent; but as we near the sea the vegetation gets sparser, until nothing but bare shingle is found. The streams which at one time fell directly into the sea now percolate under this porous shingle, so that fresh water of good quality can be obtained over the greater portion by boring a few feet; but if the old mud floor is pierced, water of a brackish quality is alone obtained. The

shingle is a nesting place for the small tern, the Kentish plover, &c., whose eggs laid in the bare shingle are with difficulty distinguished, so closely do they resemble, in marking and colour, the pebbles by which they are surrounded.

The first plant to establish itself on the shingle is *Arrhenatherum avenaceum*, which forms a colony of somewhat slender plants with rather darker glumes than the ordinary septal form. The prevailing plant has fibrous rootlets—that is, it is not *A. precatorium*, which is frequent in dry rocky ground in many places. The second plant to establish itself is an unexpected one, namely, *Digitalis purpurea*; and a third is also one that would not have been predicted, namely, *Teucrium Scorodonia*, which occurs as a stunted form, with leaves arranged as often to give the plant the same outline as *Ajuga pyramidalis*. It would appear that the comparatively heavy seeds of these species are carried by the wind and drop between the pebbles, while the pappus-borne fruits of the thistles and other composites are too light to obtain a hold on the unstable shingle. The three plants mentioned, when established, give some shelter, and thus enable other plants to colonise; among the earliest of these, and the most showy, is *Echium vulgare*, with pale bright blue flowers, of quite a different shade of colour from the *Echium* of the chalk cliffs at Dover, where the colour is dark blue and crimson. The broom is frequent, but it usually occurs in circular patches of quite decumbent growth (var. *procumbens* Bailey), which I imagine is a state rather than a true variety, caused by full exposure to sun and wind on a barren soil; this year it was very handsome from the profusion of flowers. Another strangely altered plant was the sloe (*Prunus spinosa*), which occurred in prostrate bushes only a few inches high, spreading for a considerable distance, and less spiny than usual, and in the middle of July retaining a few flowers, and as well deserving varietal distinction as the broom, but, as I believe, only a state resulting from the same causes. The holly is another curious instance. *Silene nutans* occurred plentifully; while the great abundance of *Teesdalia nudicaulis* is a striking feature, and *Galeopsis Ladanum* is plentiful, but not typical.

Not far from Dungeness a large quantity of gulls could be seen flying around one or two spots, and these proved to be some fresh-water pools where the black-headed gull nests, but the herring gulls appear to be driving out the original occupiers. Round the ponds is doubtless some peat deposit, for *Lastræa Thelypteris*, *Carex diandra* (*C. teretiuscula*), and *Comarum palustre*, and other marsh and bog plants, are found. Near them I saw a curious state of *Festuca arundinacea* growing in the shingle, in which the root and lower part of the stem were much developed, while the panicle was considerably reduced. But space will not allow me to go into further details.

The excellent *Flora of Kent* by Hanbury and Marshall leaves little room for additions, but it may be worth while to record the following plants. The sign † means that the plant is new to the district of the flora for which the numeral is given; * means that it is not recorded in the *Flora of Kent*.

**Papaver Rhœas* L. var. *Pryorii* Druce. Near Lydd.

Brassica sinapioides Roth. Plumstead Marshes.

Crambe maritima L. Still rather plentiful near Lydden Spout.

**Myagrum perfoliatum* L. Littlestone-on-Sea, Mrs. Davy, 10. Casual.

Cerastium semidecandrum L. var. **glandulosum* Koch. Littlestone-on-Sea.

Stellaria media var. *Boræana* (Jord.). †Littlestone-on-Sea, 10.

Buda marina Dum. †Dover, 7.—*B. media* Dum. *var. *glandulosa* Druce in Rep. of Bot. Exch. Club, 1899, p. 599. This plant is also referred to in Journ. Bot. 1899, p. 341. Dover, near Lydden Spout, 7.

Tamarix gallica L. Planted at Littlestone-on-Sea.

Malva sylvestris L. *var. *lasiocarpa* Druce. On shingle at Dover, 7.

Medicago lupulina L. *var. *Willdenowii* (Boenn.). In a densely hairy condition; occurred on the shingle near Dungeness and at New Romney, and plants that were densely hairy but not glandular were also noticed.

Trifolium arvense L. var. *perpusillum* DC. †Littlestone-on-Sea, 10.

Vicia hirsuta Gray var. **angustifolia* (Fries, under *Ervum*). On the shingle near Dungeness, 10.—*V. gemella* Crantz *var. *tenuissima* Druce. Near Lydd, 10. To this variety also belongs my record of *V. gracilis* from between Whitstable and Canterbury, quoted under district 3.

Lathyrus sylvestris L. Plentiful on the railway bank near Folkestone.

Rubus rusticanus Merc. The first record of this bramble is by me in Journ. Bot. 1888, p. 349.

Rosa Eglanteria Linn. †Between Lydd and Dungeness, 10.

Æthusa Cynapium L. *var. *agrestis* Wallr. Dover, 7.

Daucus gummifer Lam. †Dover, 5.

Caucalis nodosa var. *pedunculata* (Rouy & Fouc. Fl. Fr. vii. 251, under *Torilis*). In field near Lydd.

Solidago Virgaurea L. A broad leaved form occurs on chalk cliffs, Dover, 7.

Anthemis arvensis L. Dover, 7.

Centaurea nigra L. var. *decipiens* Syme. †Dover Cliffs, 7.

Campanula Rapunculus L. I have a specimen labelled Dover, collected by J. Tempère in 1876.

Jasione montana L. With white flowers at Dungeness.

Erica cinerea L. A plant from Edenbridge, sent me by Mr. Dickenson, had all the corollas deeply cleft into four segments.

Statice maritima Mill. The plant with wholly hairy fruit alone seen at Dungeness, 7.

Ligustrum vulgare L. The abundance of this plant on exposed chalk cliffs, and its occurrence on shingle, is a noteworthy feature.

**Anchusa officinalis* L. As a casual at Littlestone-on-Sea, Mr. Davy.

Euphrasia Kerneri Wetts. †On the cliffs near Dover, 7. — *E. nemorosa* Pers. †Near Dover, 7.

Orobanche amethystea Thuill. Abundant at Lydden Spout on *Daucus*.

Plantago Coronopus L. A form simulating *P. macrorrhiza* Poir., a southern species. Shakespeare Cliff, Dover.

Polygonum Convolvulus L. var. *subalatum* Van Hall. †Dover, 7.

Euphorbia amygdaloides L. This sylvan species grew out of a dry chalk cliff near Dover, in full sun and wind exposure.

Juniperus communis L. A prostrate form simulating *J. nana* occurred †on the chalk cliffs near Dover, 7; but one could see it alter in character where it was less exposed.

Salix aurita × *cinerea*. †Folkestone, 7.

Iris fœtidissima L. †Freely flowering on the cliffs near Lydden Spout, Dover, 7. — *I. Pseudacorus* L. var. *acoriformis* (Bor.). †Dungeness.

Typha angustifolia L. †In the ponds in the shingle, Dungeness, 10.

Carex disticha Huds. *var. *longibracteata* (Schleicher). By the Dungeness ponds with the type; the inflorescence is long, slender, and much interrupted, and the lower spikelets have a long bract.— *C. distans* L. Littlestone-on-Sea, 10. — *C. extensa* Good. †Littlestone-on-Sea, 10.

Setaria viridis Beauv. †Dover, 7.

Kœleria cristata Pers. var. *gracilis* (Bor.). †New Romney, 10.

Phleum pratense L. var. *nodosum* (L.). Dover, in cornfields, 7.

Dactylis glomerata L. *var. *abbreviata* Bernh. Dover, 7.

Poa subcærulea Sm. Dover. Near New Romney, 10.

Agrostis alba L. var. *stolonifera* (L.). Dover, 7.

Glyceria Borreri Bab. Littlestone-on-Sea.

Festuca rubra L. var. *pruinosa* Hackel. Near Dover, 7. — *F. arundinacea* Schreb. On the undercliff near Dover by Lydden Spout, 7. Shingle near the ponds, Dungeness, as a curious and possibly a new variety, 10.

**Adiantum Capillus-Veneris* L. On a wall at Walmer Castle, 5.

Chara fragilis Desv. Dungeness.

THE EUROPEAN SPECIES OF SEMATOPHYLLUM.

By Elizabeth G. Britton.

In part twenty-one of the *British Moss Flora* Dr. Robert Braithwaite has adopted the genus *Sematophyllum* in the sense in which Mitten originally founded it. It will be seen by the following synonymy that it has the right of priority as a genus over *Raphidostegium*, and that the latter is antedated as a subgenus by *Aptychus* C.M.

SEMATOPHYLLUM Mitt. Journ. Linn. Soc. viii. 5, 1864.
Hypnum (subsect. *Aptychus*) C.M. Syn. Musc. ii. 325 (1851).
Rhynchostegium (subgen. *Raphidostegium*) Br. & Sch. Bryol. Europ., fasc. 49–51 (1852).
Raphidostegium De Not. Cronaca, ii. 31, 1867.
Rhynchostegium (sect. *Raphidorhyncha*) Schimp. Syn. Musc. ed. 2, 678–680 (1876).

It must be admitted, however, that it would have been far better had Mitten raised *Raphidostegium* to generic rank, as all the essential characters of the genus were recognized in the *Bryologia Europæa*, and several American and European species were named. In fact, *Hypnum demissum* was named in both.

On comparing the literature, it will be found that there is great diversity of usage in various standard works. Jaeger and Sauerbeck, in the *Adumbratio*, recognized 134 species of *Raphidostegium*, and 53 of *Sematophyllum*, but the type-species of the latter was included in the former, as well as many species which had been referred to *Sematophyllum* by Mitten in his *Musci Austro-Americani*. Paris, in the *Index Bryologicus*, listed 295 species of *Raphidostegium* and 124 of *Sematophyllum*, with the type-species of the latter included in the former; he also reduced the genus *Pungentella* C.M. to *Sematophyllum*. Carl Müller continued to use his names *Aptychus* and *Pungentella* as synonymous to the usual use of *Raphidostegium* and *Sematophyllum* as long as he lived. He published nine species of *Aptychus* from the West Indies, of which six were described as new (*Hedwigia*, xxxvii. 256, 1898); and one year later, in the same journal, Brotherus described a new species of *Raphidostegium* from Japan, showing that there is no uniformity of usage, even at the present time.

The type-species of *Sematophyllum* is European, and the synonymy is as follows:—

1. SEMATOPHYLLUM SUBSTRUMULOSUM (Hampe).
Hypnum (*Aptychus*) *substrumulosum* Hampe in Bot. Zeit. xx. 12, 1862.
Sematophyllum auricomum Mitt. in Journ. Linn. Soc. viii. 5, t. 2 (1864).
Hypnum (*Rhynchostegium*) *surrectum* Mitt.? Journ. Linn. Soc. viii. 6, t. 2 (1864).
Rhynchostegium Welwitschii Schimp. Syn. Musc. ed. 2, 679, 1876.
Raphidostegium Welwitschii Jaeg. & Sauerb. Adumb. 388, 1877.
Eurhynchium Welwitschii Husn. Musc. Gall. 343, 1897.
Type-locality, Canary Islands, Madeira, Teneriffe, and Portugal.
Habitat on rotten trunks and on olive-trees.

It will be seen, by comparing the synonymy as given by Limpricht in the *Laubmoose* (Rabenh. Kryptfl. iv. 3, 237 (1897)) with the above, that a number of mistakes have been corrected, and that the original specific name has been substituted for a manuscript name given by Schimper in 1846, in a letter to Welwitsch. Mitten compared *S. auricomum* with *S. demissum*, and described *Hypnum surrectum* on the following page, figuring it on the same plate, with

costate leaves. It seems doubtful, therefore, whether it can be the same species. No mention of these species is made by Cardot in his *Mosses of the Azores and of Madeira*, and it is evident, as he says in the preface, that further exploration and collecting on these islands is necessary.

2. SEMATOPHYLLUM DEMISSUM (Wils.) Mitt.
Hypnum demissum Wils. in Eng. Bot. Suppl. t. 2740 (1832).
H. demissum De Not. Mant. Musc. xx. 35, 1836.

One of the most curious coincidences in the naming of this species seems to be that Wilson and De Notaris should both have chosen the same name for this species, each apparently without any knowledge of the action of the other. At least it would appear to be the case, as cited by Limpricht, who fails to give *Sematophyllum* among its synonyms.

This species has long been credited to America, but Carl Müller (Syn. Musc. ii. 327 (1851)) credited it only to Europe, and described the American species as *H. carolinianum*. A recent critical comparison of fruiting specimens has convinced me that he was right. It may be said, in excuse for the delay in coming to this conclusion, that fruiting specimens of the European species have been exceedingly rare in American collections, and that the two species resemble each other very closely. But Limpricht's figures of the four-celled stomata are unlike the normal guard-cells of the stomata in *S. carolinianum*, and the inner face of the teeth in the American species is much more deeply and distantly trabeculate; the teeth also differ in being more strongly papillose and more finely pointed in the American species, and the leaves have the walls of the cells less thickened and are not porose. It may be doubted, also, whether the specimens from Japan, referred to *S. demissum* by Brotherus (*Hedwigia*, xxxviii. 230, 1899), may not also be distinct.

3. SEMATOPHYLLUM NOVÆ-CESAREÆ (Aust.) E. G. Britton.
S. micans (Wils.) Braithw. Brit. Moss-fl. iii. 154 (1902).
N. Novæ-Cesareæ E. G. Britton in Bryol. v. 66 (1902).

Dr. Braithwaite has transferred the oldest specific name for this species, and gives as his reason that both *H. micans* Sw. and *H. micans* Wils. have been referred to other genera. The fact still remains that the former has precedence by four years, and the latter is a homonym. *S. Novæ-Cesareæ* has only been collected once in fruit, and the teeth show remarkably deep cristate ridges on their inner face.

In the *Bryologist* for July I have printed in full the synonymy of the species found in the United States, having restored five old specific names and reduced *H. Jamesii* to *H. pallescens*. I have also reduced three of Kindberg's species, described from Macoun's Canadian collections.

ORIGIN OF THE DEADNETTLES IN BRITAIN.*

By S. T. Dunn, B.A.

Seven species of Deadnettles have been recorded for the British flora, and for the purposes of the present paper they may be placed in three groups according to the kind of situations in which they grow.

(1) In the first group *Lamium Galeobdolon* stands alone, because it is the only member of the genus which naturally inhabits our woods.

(2) The second consists of those which thrive well and spread plentifully in hedges, cultivated fields, roadsides, or waste ground, but are unknown except in places which are prepared for them unintentionally by man. These are the White Deadnettle (*Lamium album*), the Purple Deadnettles (*L. purpureum* and *L. incisum*), and the Henbit Deadnettles (*L. amplexicaule* and *L. intermedium*).

(3) In the third group will be left *Lamium bifidum* and *L. maculatum*, which seem to have an insecure footing in our flora, being found only where they have escaped from gardens, or been introduced with agricultural seed, and never spreading of their own accord.

To begin with the first group, it is necessary to enquire what is the present distribution of *L. Galeobdolon* (Yellow Archangel), for, before determining whence a plant has spread, it is of course essential to find out exactly where it grows now. This species occupies a well-defined area in western Siberia and Europe (including southern and mid-England), but does not reach the most northerly regions of the two continents. It doubtless spread into this country when it became again suitable for vegetation at the end of the last glacial period, gradually advancing as the ice receded, for, at that time, the present British Channel was dry land, and most of our present flora was able to spread from the Continent to the promontory of which the British Isles are now the only remains. At this period it is improbable that man had made his appearance in north-western Europe, and it was not until much later that the growth of villages and the clearing of woods for pastoral and agricultural purposes afforded a footing for the weeds of the second group; but exactly how and when they each appeared are questions that cannot now be answered. Weeds were very little noticed, and with a few exceptions never referred to by the writers of the earliest books relating to this country. The first scientific records of the occurrence of wild flowers in Britain date from the sixteenth century, and at that time all the members of the first two groups were probably present, although it was not until later that *Lamium incisum* and *L. intermedium* were seen to be separable from their commoner allies. Prior to these records of the sixteenth-century herbalists, there is no means of determining the presence

* Reprinted by permission from the *South-Eastern Naturalist* for 1901.

or absence of special species except such as is afforded by the necessarily meagre evidence of geology. Various deposits containing plant remains, and supposed to date from pre-glacial right up to Roman times, have been discovered in England, and Mr. Clement Reid has summarized the facts obtainable from these sources in his *Origin of the British Flora*, but, unfortunately, so far, no fragments of any species of *Lamium* have been found. We have, then, to rely on what is known of the habits and distribution of the Deadnettles at the present time, and try to deduce from them some idea of their past history.

When new and previously undisturbed land in England is first entered by man, and as soon as he has begun to make fields, villages, and roads, certain weeds spring up which have never grown there before. Among these some of the Deadnettles very frequently find a place.

Seeing, then, that man reached England from the Continent, and that these weeds grow abundantly there, it is fair to assume that they arrived in this country at about the same time as he did, and by his means. How they came to be man's companions in his early wanderings is a more difficult question, but, as it is clearly involved in any discussion of their origin, it must be considered under each separate species. The opinion is so general, and is so confidently expressed in our Floras, that the White Deadnettle is a native of Britain, that this species will be taken first, and the facts relating to its origin carefully considered.

When the floras of various countries are compared, it is found that the White Deadnettle is a native of woods and forests throughout a broad belt of the north temperate zone, extending from Spain and Morocco on the West to the province of Trans-Baikal, in southern Siberia, and the Himalaya mountains on the East, and including Dalmatia, Austria, south-eastern Russia, the Caucasus, Persia, and the Altai range. Besides this, it occurs about villages, roadsides, hedges, and waste places, not only in those regions, but throughout almost the whole of the north temperate zone of the whole world. A clear distinction can be drawn between its range as a native and its range as a weed, the latter being much larger than and enclosing the former. In such districts as south-eastern Russia it occurs as a native and as a weed, and Korshinsky, in his flora of that region, pointedly divides his localities into two parts. It grows, he says (1) among bushes on shady slopes and in damp woods; (2) in gardens, hedges, and waste places, the latter stations becoming more frequent, the former less so, as one goes northwards. No one will doubt that, in such a case as this, the plant spread from its original stations in the woods along the hedges and roads soon after they were first made; but what is to be said of the countries such as ours, where it is never found in woods or any other perfectly natural locality? It must, I think, be admitted that it is not native here; for, if it could compete with our northern flora, without the unintentional help of man, we should find it in the woods just as in the south of Europe. We must imagine that the species left its native forests when man first prepared the way

for it, and then spread gradually with him, eventually arriving in Great Britain. Here, therefore, it would seem to be an introduced plant, far from its native country, but it has gained a footing which it will doubtless maintain, unless, for any reason, man and his operations should cease.

This explanation of the introduction of *Lamium album* seems the most reasonable one, judging from our present information, but there is another possible one that has been advanced in the case of some other weeds which accompany human dwellings. While, in a perfectly natural state, before the advent of man, there have doubtless always been localities which have been kept disturbed by wild animals, Europe, before man's arrival, was certainly occupied by much larger numbers of wild mammals than are to be found now, but they have gradually been hunted down and driven into the wilder regions by man's advance. It has been argued that, prior to human occupation, these disturbed spots may have harboured the same weeds as have since attached themselves to the neighbourhood of human habitations. If the weed in question had reached England in this way, it would be a native—*i. e.* it would have been brought by natural, not by human agency. The facts are, however, against such a conclusion, for nowhere has it been recorded as growing about the haunts of such wild animals as are left to us. It is in vain that one searches for it about rabbit-burrows, fox-earths, and such like places; it is, indeed, in just those wild regions where our indigenous animals are most plentiful that this weed is most scarce. We are justified, then, in falling back on our first hypothesis of its introduction by man.

The question of the status of the White Deadnettle is not quite the same as that of its origin in our flora, but, if anyone doubts its dependence upon man, let him only note in his mind the exact localities where he finds it growing, or, still better, let him take a small piece of country and mark on a large-scale map all the places where it grows, and he will certainly be driven to the conclusion that it cannot exist without help. As a matter of fact, he would find it in the hedges and banks around houses, fields, and roads, wherever periodical disturbance of the ground takes place, as in the renewing of ditches or the cutting back of banks; but where the hedges or banks have long been undisturbed he will not find it. It cannot be expected that the whole of England can be searched very carefully for a native record of the weed, but as long as none is forthcoming we must allow that it probably is not permanent, except where man is constantly at work, and that it cannot, therefore, be included in the indigenous flora of the country.

To pass on now to the case of the Purple Deadnettles (*L. purpureum* and *L. incisum*), we are confronted by a more difficult problem. We may take the two forms together, as they are very closely allied, and stand on exactly the same footing in our flora. Unlike the White Deadnettle, the present species is an annual, which inhabits cornfields and other cultivated ground, open roadsides, borders of fields, and such like situations. It extends in these habitats over the whole of Europe, northern Africa, Siberia

and the Orient. It is so common in most parts of this area and so free in its choice of localities that it is impossible to say where it exists as an unaided and indigenous plant, and where it is introduced. Here and there one finds it recorded from clearings in woods, from pastures and other habitats which may or may not be quite wild; but never in England, so far as I can find, has it been so recorded, and I fear we are hardly justified in claiming it as an indigenous plant until, being known in some spot which has long been undisturbed, it is so proved to be capable of existing unaided in our natural flora.

For a similar reason to that which led us to consider *L. purpureum* and *L. incisum* together, the two last members of the second group, *L. amplexicaule* and *L. intermedium*, may be associated. The former extends over the whole north temperate zone of the old world, and is nowhere recorded as anything but a weed of cultivated and waste ground. We are apt to take it for granted that every known species must be wild somewhere, or else that it was once wild, but is now extinct as a wild plant. There are, however, many cultivated plants as well as weeds (such as the above) which the most diligent search has failed so far to reveal in wild situations, and it does not seem probable that all these have been lost as wild plants. It is, however, possible that they are derived from wild stock, and have become so much changed by cultivation or by acting the part of weeds that they now seem to be distinct species. No doubt when a wild plant spreads into cornfields, it can become permanent there only by accommodating itself to certain conditions; it must be an annual, or its roots will be disturbed by ploughing in the spring; it must get a good start of the crop, and it must flower and seed before the crop is cut. Now, it is a matter of general observation that when the surroundings of a species are most unfavourable, or when it is advancing into new circumstances, then variation becomes most apparent, and new forms make their appearance. It is, therefore, quite conceivable that the change in habits necessitated by life in cornfields might, in the course of many centuries, so change a race of plants that they might appear finally to be distinct from their parent stock. The production of a species by artificial means—for this would be no less—is not considered impossible by botanists; in fact, it has been actually suggested, in the case of the Brome grasses, as a means of explaining the presence of the numerous species which inhabit the cultivated fields of Europe.

Finding, then, that *Lamium amplexicaule* is not known except as a weed of artificial situations, one turns to some of its nearest allies to see if there be any wild species very closely connected with it, and from which it might possibly be derived. In this case there is *Lamium macrodon*, a plant which is very much like *L. amplexicaule* in habit, differing chiefly in having longer and narrower calyx teeth; it inhabits the cedar forests of Asia Minor, and is also found in the surrounding country in fields and waste places. This species, I would suggest, is the progenitor of *Lamium amplexicaule*. If this be correct, we must imagine that, in ancient times, before

Asia Minor was invaded by our ancestors, the forest species was flourishing in its present place, but that its cornfield descendant was non-existent. When man had arrived and had tilled the ground, it gradually spread into the fields, undergoing certain internal and external changes in accommodating itself to its new life. As it spread with man far from its original home, these changes became emphasized and fixed, and eventually the new race became so different that, when its parent species was found (long after it had itself been described and named), it could not be recognized as the same species as our common weed.

There are now left to be accounted for two species, which seem to have only a slight foothold in England. *Lamium bifidum* has once been found growing plentifully in a cornfield in Yorks. It is a native of woods in south-eastern Europe, and is also known in cornfields in some of the districts from which we import corn. In the present case it was doubtless sown with seed corn derived from the East, and in the absence of further records may be supposed to have long since disappeared. *Lamium maculatum*, though not uncommon, is not really spontaneous with us, but, being a common cottage garden plant and a perennial, it often survives for many years where a root happens to be thrown out. It is a curious fact that, although the most obviously non-indigenous of all our introduced Deadnettles, yet its native range approaches our islands more closely than any of them, for its area extends from Persia over mid- and southern Europe, and reaches the woods of southern Belgium.

The chief facts bearing on the origin of the English Deadnettles have now been discussed, and seem to point to the conclusion that one was introduced by horticulture, one with foreign seed, that five accompanied the colonization of the country by man, and that one only is undoubtedly indigenous.

REPORT OF DEPARTMENT OF BOTANY, BRITISH MUSEUM, 1901.

By George Murray, F.R.S.

The additions to the collections by presentation have consisted of:—153 specimens, mostly from near Cape St. Antonio, Buenos Ayres, from Ernest Gibson; 70 specimens, including 23 Ferns, 83 specimens of woods, and 3 fruits, from H. N. Ridley; 168 Phanerogams and 11 Cryptogams from Siberia, from W. H. Shockley; 36 specimens from Greylingstadt, Transvaal, from Capt. Vandeleur; 17 specimens, principally Canadian, from Arthur Bennett; 80 specimens from near Kalgan, Eastern Mongolia, from C. W. Campbell; 9 specimens of African and American *Eriocaulon*, from Prof. Engler; 2 specimens of Palm fruits, from Kitue, East Africa, from Dr. S. L. Hinde; 180 plants, including 3 Cryptogams, from Van, from Major F. R. Maunsell; 100 specimens from Jamaica, from W. Fawcett; 162 Phanerogams and

9 Cryptogams from South Africa, from Dr. S. Schönland; 380 plants, including 6 Ferns, from India, from Dr. Prain; 118 specimens from Natal, from J. Medley Wood; 2 specimens from Teneriffe, from Ed. Armitage; 104 specimens, including 14 Cryptogams, collected on 1st, 2nd, and 3rd Voyages of Capt. Parry, from Rt. Hon. Lord Walsingham; 21 specimens from Naini Tal, N. India, from Miss M. K. Wall; 2 species of *Blepharis* from Natal, from P. E. F. Perrédès; 12 specimens of *Loranthus* from Sydney, from J. H. Maiden; 5 specimens from N.W. India and Central Asia, from Herr Max Leichtlin; 11 Marine Algæ from Brisbane, from Mrs. Hubert Barton; 2 species of Lichens from British Central Africa, from the Rev. David Lillie; a microscope-preparation of Diatoms from Torres Straits, from Prof. Perceval Wright; 22 specimens and 5 microscope-slides of Mycetozoa, from Arthur Lister; Diatomaceous Ooze from the coast of Cape Colony, from J. D. F. Gilchrist; 11 Indian and 1 rare Italian Moss, from Dr. Emilio Levier; 26 Cryptogams from Borneo, from Dr. Charles Hose; 114 Marine Algæ from Japan, from Mr. Y. Hirase.

The following additions have been made by presentation to the British Herbarium:—14 Phanerogams and 5 Characeæ, from C. E. Salmon; 6 specimens of British plants from Dufton, from Prof. D. Oliver; 352 specimens, including 15 Characeæ, from Rev. E. S. Marshall; 13 specimens from Cornwall, from Clement Reid; 3 specimens from Messrs. H. & J. Groves; specimens of *Octodiceras* from the River Severn, from J. B. Duncan; and specimens of *Cladophora* from the Hebrides, from Major J. P. Langley.

The following additions have been made by exchange of duplicates:—4 specimens of *Najas marina* and vars. from Prof. Hans Schinz; 180 Australian plants from J. H. Maiden; 3 specimens of *Symplocos* from Dr. Urban; 6 specimens of British plants for Exhibition Case from C. E. Salmon; 108 Indian Cryptogams from Mrs. Bradford; and 100 Kryptogamæ exsiccatæ from the K. K. Naturhist. Hofmuseum of Vienna.

The following specimens have been acquired by purchase:—130 Phanerogams, 77 Cryptogams, and 55 Wood specimens from Cameroons, by Zenker; 445 specimens, including 3 Vascular Cryptogams from South Africa, by R. Schlechter; 221 Phanerogams and 16 Cryptogams from New Mexico, by F. S. & E. Earle; 1059 Gulf Coast plants, including 8 Cryptogams, by S. M. Tracy; Kneucker's Carices VIII. and IX., containing 31 and 32 specimens respectively; 190 specimens, including 1 Fern from Mexico, by C. G. Pringle; 708 Phanerogams and 114 Cryptogams from Georgia, by Rowland Harper; Cent. 33 and 34 Flora exsiccata Austro-Hungarica; 900 Phanerogams and 145 Cryptogams from Central China, by Father Hugh; 471 plants from West Australia, by Dr. Pritzel; "Gramineæ exsiccatæ," Fascicle III.–VI., 125 specimens, by A. Kneucker; Cyperaceæ and Juncaceæ, Fascicle II., 32 specimens; 771 specimens, including 52 Cryptogams from Kunene-Zambesi Region, by H. Baum; Herb. Normale, Fascicle XLI., by Schultz; 180 specimens from Siam, including 1 Fern, by Zimmerman; 428 specimens from Mexico, including 3 Cryptogams,

from E. O. Wooton; 8 drawings for Exhibition Gallery by Percy Highley, also 4 large water-colour drawings; 8 models illustrating germination, by Mrs. Blackman; 32 photographs of trees and their barks, by Henry Irving; 2 sheets of water-colour drawings and 180 sketches of British Basidiomycetes, by Worthington G. Smith; 125 Micro-Fungi, by Vestergren; 100 Saxon Fungi, by Krieger; 50 Malaysian Mosses, by Fleischer; 176 Brazilian Cryptogams, by Robert; 100 Hawaiian Algæ, by Miss Tilden; 100 Uredineæ, by Sydow; 2 photographs of Algæ, by Nordstedt; 125 North American Algæ, by Collins, Holden, and Setchell; 161 Equisetaceæ, by Wirtgen; 31 Hepatics of France, by Husnot; 50 Ascomycetous Fungi, by Rehm; 27 North American Uredineæ, with photographs and illustrated pamphlet, by Arthur and Holway; 100 North American Fungi, by Shear, Ellis, and Everhart; 69 North American Mosses, by Renauld and Cardot; 200 Italian Fungi, by Saccardo; 200 European and exotic Fungi, by Rabenhorst-Pazschke; and 25 Characeæ, by Migula, Sydow, and Wahlstedt.

SHORT NOTES.

Hybridity in Hieracium.—As Mr. F. N. Williams has mentioned my name in the course of his remarks on this subject (pp. 315, 330), perhaps I may be allowed to say a few words. There is (I think) no necessary connection between the view taken as regards hybridity and the acceptance or non-acceptance of evolution. Some of the forms now fixed, and treated as true "species," may have had a hybrid origin; but this is a speculative matter, hardly capable of proof. I do not, as he suggests, "look askance at" the hybrid-theory respecting hawkweeds; many hybrids seem to occur in Europe, and a few in Britain. Still, my experience (agreeing, apparently, with that of others) is that they are decidedly rare *in this country;* for what reason, I am quite unable to say. In cultivation I never obtained any intermediates, whereas they were plentiful among the *Epilobia;* nor have I hitherto succeeded better where two or more species grew together in a wild state, although constantly on the watch. It is highly desirable that some acute and careful botanist should make a lifelong study of this most difficult genus in Britain; but Mr. Williams, who is somewhat severe on his fellow-countrymen, does not appear to have a sufficient personal acquaintance with our living plants to justify his rather *ex cathedrâ* pronouncements.—Edward S. Marshall.

Euphrasia curta, *forma* piccola.—Under this name Mr. Townsend describes in Ann. Scott. Nat. Hist. for July, p. 177, a plant gathered by Prof. Trail near the loch of Loirston in Kincardineshire, by Mr. Beeby at Baltasound, Shetland, and by the Rev. W. R. Linton near Bethesda, Carnarvonshire. Mr. Townsend's description, drawn up from Shetland specimens, is as follows:—

"*Caulis tenuis erectus*, 2½–3 *cm. altus*, *simplex* sed infra medium ramis curtissimis flores non gerentibus instructis, setis crispulis

albidis reversis pubescens, rubescens, vel fuscescens ? Folia numerosa, internodiis plerumque brevibus, obtusa cuneato-ovata, inferiora opposita dentibus utrinque 1–2 obtusis, superiora subopposita vel alternantia dentibus utrinque 3 obtusis. Bracteæ alternantes, in tertia parte inferiore latissimæ, inferiores obtusæ vel acutæ *dentibus utrinque* 3 *acutis*, superiores acutæ, dentibus 2–3 acutis. Folia omnia planiuscula, sicca nigricantia, *in pagina superiore et inferiore setis sublongis crispulis albidis obsita. Flores pauci* subsessiles *in spica brevi, fructu paululum elongata. Calyx indumento* ei foliorum et bractearum similis, dentibus triangularibus acutis. *Corolla parva* 3–4 *mm. longa* alba labiis æquilongis striis (cœruleis ?) notata ; lobi labii inferioris subæquales, emarginati, macula flava picti ; lobi labii superiores integri. Stigma curvatum. *Capsula* superne *lata truncata* vix emarginata, basin versus angustata, longitudine latitudinem circa duplo-superans, *calycis dentes non superans plerumque subæquans superne pilosa margine longe ciliata.*

"*Euphrasia piccola* is a remarkably elegant plant ; its slender unbranched stem (though doubtless the short branches or buds in the axils of the lower leaves would occasionally become developed), its numerous leaves and short internodes, its few and small flowers, and comparatively abundant long white pubescence are very noticeable characters. Our plant differs from *E. micrantha* Brenner by its flowers, which exceed the bracts, the latter being acutely, not obtusely toothed, by the entire lobes of the upper lip of the corolla, and by the pubescence just alluded to. From dwarf unbranched specimens of the usual type of *curta* Fr. it differs by its much smaller flowers, smaller and obtusely toothed leaves, smaller bracts, and much more slender habit ; from *E. mollis* by its more numerous leaves and short internodes, its fewer-toothed bracts, and the entire lobes of the upper lip of the corolla ; from *E. gracilis* by its smaller corolla, the upper and lower lobes of which are equal, by its obtusely toothed leaves, and by the presence of the almost shaggy white pubescence ; from small specimens of *E. scotica* by the last-named character, and by the much smaller ovate (not cuneate-oblong) leaves and bracts."

Ranunculus Lingua in Berkshire.—On Aug. 24 I found *Ranunculus Lingua* in some quantity in a pond at Yattendon, in the Pang district, for which it is not recorded in the *Flora of Berkshire*.—James Britten.

Erica Stuarti.—Under this name the Rev. E. F. Linton describes in the *Annals of Scottish Natural History* for July (p. 177) a heath found in Connemara by the late Dr. Charles Stuart, which Mr. Linton considers to be hybrid between *E. mediterranea* and *E. Mackaii*. His description is as follows :—

"*Erica Stuarti*, nov. hybr.—Leaves in whorls of four, or irregularly scattered, ovate-oblong or lanceolate, ciliate, glabrous above, puberulous (mealy) beneath except on the glabrous midrib, margins revolute ; young twigs hairy ; sepals ovate-acuminate ciliate, puberulous towards the tip ; corolla cylindric-urceolate, nearly white below, shading upwards to deep rose-purple ; stamens

and styles somewhat exserted; ovary nearly glabrous with a few hairs upwards."

IMPATIENS BIFLORA IN SOMERSET.—I send specimens of this plant from the water-meadows near Flintford Farm, Frome; it has been noticed there for several seasons, but only since American grass seed has been used.—SELINA C. HARDING.

NOTICES OF BOOKS.

Flora of Tropical Africa. Edited by Sir WILLIAM T. THISELTON-DYER. Vol. iv. part 1, pp. 1–192. Price 8s. net. L. Reeve & Co.

THIS latest instalment of the *Flora of Tropical Africa*, beginning with the *Oleaceæ* and *Salvadoraceæ* by Mr. Baker, is mainly occupied with the *Apocynaceæ*, but does not complete that order. In many respects it is one of the most important that has yet appeared, and Dr. Stapf, who has monographed the *Apocynaceæ*, is to be congratulated on what is evidently a very thorough piece of work. The publication is also interesting because it takes up the Flora at the place where it was left by Prof. Oliver in 1877. Whatever obstacle there may have been to continuous publication has now been removed, and we hope that as little time as possible will be allowed to elapse before the completion of the volume.

In the treatment of the order Dr. Stapf has followed Pierre and K. Schumann in breaking up *Tabernæmontana* into several genera, which has resulted in the exclusion of the genus, as now restricted, from the Old World. Besides adopting the genera of these authors, Dr. Stapf has added others of his own—*Vahadenia* (based on *Landolphia Laurentii* De Wild.), *Polyadoa* (including *Carpodinus umbellata* K. Schum.), *Pterotaberna* (*Tabernæmontana inconspicua* Stapf), *Ervatamia* (*T. coronaria* Willd.), *Callichilia* (various species of *Tabernæmontana*); he restores George Don's genus *Conopharyngia* (assigned by a slip to D. Don), to which are assigned a large number of species originally placed by himself and others under *Tabernæmontana*. A large proportion of the species are new, which is remarkable in face of the number described by recent workers. The bibliography is very copious, often occupying half a page, and in at least one instance nearly a page. We think the titles of some of the works cited might have been further abbreviated; but the importance of the rubber-yielding genera and of *Strophanthus* doubtless justifies the extensive references. A paper on the former was read at the Linnean Society by the present editor of the *Flora* twenty years ago, but for some reason was never published. It will be remembered that certain names were published in the Kew Gardens Report for 1880 (issued in 1881), some of which have passed into general use, although they appeared without diagnoses; these are cited as of "Dyer," although it would appear from the context that "Hook. f." should be attached to them. One of them, *Landolphia Mannii*, appeared as a *nomen nudum*, and is properly set aside by Dr. Stapf

in favour of *L. Klainei* Pierre (1898), with which he thinks it "almost certainly identical"; it is to be regretted that any doubt as to this should be allowed to remain, especially as the editor must be in a position to say definitely what plant he had in view. When this and other *nomina nuda* in the same Report were first published, we called attention (Journ. Bot. 1881, 381) to the undesirability of such publication; Trimen, however (Journ. Bot. 1882, 239), defended them as "the results of hard work at a troublesome set of plants." But these results have never been made public, and the descriptions belonging to the names in question, so far as these exist, must be sought for elsewhere than in the Linnean Society's Transactions, for which it was understood they were prepared.

It is inevitable that even the most careful monographs are open to criticism in details, and it is no disparagement to Dr. Stapf's work to say that it is not exempt from such liability. For example, under *Diplorhynchus*—a genus which he cites as of "Welw. in Trans. Linn. Soc. ser. 2, ii. 22," but which would be more correctly quoted as "Welw. ex Ficalho & Hiern in Trans.," etc.—we find "*D. angolensis* Hiern in Cat. Afr. Pl. Welw. i. 667 partly," placed under *D. Welwitschii*, with the citation of one of the three Welwitsch numbers quoted by Hiern. No indication is given as to the position of the other numbers, nor is the other "part" of *D. angolensis* Hiern referred to any other species; it is not *D. angolensis* Büttner—the species retained—as a reference under that expressly states "not of Hiern." The misreading of a note in Trans. Linn. Soc. 2nd Ser. iv. 25 (which might perhaps have been more clearly expressed, although its meaning seems plain to the writer) is responsible for the unnecessary addition of "partly" to the name *Tabernæmontana Stapfiana* Britten (p. 147) and in the reference to *T. angolensis* under the preceding species. We see no reason why Mr. Hiern's identification of *Pacouria* with *Landolphia* and consequent restitution of the earlier name should not have been followed; even on the "fifty years' limit" rule, *Pacouria* stands, as it was first placed (doubtfully) under *Landolphia* by Bentham and Hooker (Gen. Pl. ii. 693). These authors indeed say "ex sola icone et descriptione auctoris nota," but this merely means that at that time the National Herbarium was very perfunctorily consulted, and Aublet's type therein was consequently not examined by them.

We are inclined to take exception to the citation of MS. names (p. 110), although the fact that plants bearing such names are not unfrequently sent out from Berlin may justify the proceeding. But the monograph as a whole deserves high praise, and we trust its conclusion will be as little delayed as possible.

European Fungus Flora: Agaricaceæ. By GEORGE MASSEE, F.L.S. London: Duckworth & Co. 1902. Pp. vi, 274. Price 6s. net.

BRITISH mycologists will extend a hearty welcome to Mr. Massee's comprehensive Flora of European Agarics. He has provided in a handy one-volume form a key to all the known European species,

brought up to date, and carefully arranged and classified. Such a compilation will be of great service to all field workers; they can thus see at a glance the account of any desired agaric without having to hunt through the more extended descriptions; and they can easily compare the British forms with those that have been found in more northern or more southern latitudes. The wide distribution of many fungi renders such a Flora specially useful.

Mr. Massee has slightly altered the arrangement from that of his previously published Fungus Flora. He has adopted the method with which we are familiar in Stevenson's *Hymenomycetes*—a work which, by some curious accident, is omitted from Mr. Massee's bibliography—beginning with the *Leucosporæ*, or white-spored forms; then follow, in order, the *Rhodosporæ*, the *Ochrosporæ*, and the *Melanosporæ*.

The author hopes to be successful in correcting false impressions as to the significance of the term species. He has found that the student is too ready to look on a species as "much more sharply defined than proves to be the case when the Fungus Flora of Europe is included." Many agarics pass through a variety of phases during their short existence, and the published diagnosis probably gives an account of one only. Has the student never been tripped up by *Armillaria mellea*, that he should retain a cocksure attitude in regard to specific distinctions? Has he never puzzled himself in vain to distinguish between closely allied species of *Lactarius*, and is he always sure about the *Russulæ* when prolonged rain has washed them to a dull sameness of colour? There is usually some constant character which enables the fungologist to decide on the species, but even that may be obscure. Mr. Massee is somewhat less than sympathetic towards the already sufficiently bewildered student.

Mr. Massee gives only the essential features of the plants, rejecting those that are trivial or due to local circumstances. For further information the student is referred to the works recommended in a short bibliography, from which, as we have noted, Stevenson's *British Fungi* (Hymenomycetes), the principal British book on the subject, is omitted.

The number of European species described is 2750, of which 1553 have been found in Britain—a larger number, Mr. Massee states, than is recorded for any other European country. The non-British forms are indicated by brackets; they are not confined to any particular section, but are scattered pretty evenly over the pages. In the days to come we may hope to see the brackets removed from many of them; Mr. Massee's book, we doubt not, will materially help to that end by indicating lines for successful field-work.

A. L. S.

*ARTICLES IN JOURNALS.**

Botanical Gazette (21 Aug.). — F. D. Heald, 'Electrical conductivity of plant juices.' — W. B. McCallum, 'Change of form in *Proserpinaca palustris*.' — A. Schneider, 'Contribution to biology of *Rhizobia*' (1 pl.). — E. Nelson, 'Notes on certain species of *Antennaria*.'—H. S. Reed, 'Survey of Huron River Valley.'—F. Ramalez, 'Trichome structures of *Erodium cicutarium*.' — E. B. Copeland, 'Two Fern monstrosities.'

Botanical Magazine (Tōkyō).—(20 July). T. Makino, 'Observations on the Flora of Japan' (cont.).—K. Shibata, 'Experimentelle Studien über die Entwickelung des Endosperms bei *Monotropa*.'

Bot. Notiser (15 Sept.). — T. Vestgren, 'Verzeichnis nebst Diagnosen und kritischen Bemerkungen zu meinem 'Micromycetes rariores selecti.' '—P. Dusén, *Saxifraga oppositifolia* var. nov. *elongata*.—L. M. Neuman, 'Anteckhingar till Möens flora.'

Bull. de l'Herb. Boissier (31 Aug.).—C. De Candolle, 'Les hypoascidies de *Ficus*' (2 pl.).—P. Chenevard, 'Contributions à la flore du Tessin.' — O. & B. Fedtschenko, 'Matériaux pour la flore de la Crimée' (cont.).—H. De Boissieu, 'Quelques Ombellifères de Chine.' —R. Chodat, 'Plantæ Hasslerianæ' (cont.).

Bull. Soc. Bot. Belgique (xl, fasc. 2; 10 Sept.). — T. Durand & E. De Wildeman, 'Matériaux pour la Flore du Congo' (concl.).

Bull. Torrey Bot. Club (30 Aug.). — M. Slosson, 'Origin of *Asplenium ebenoides*.'—A. W. Evans, 'Hepaticæ of Puerto Rico' (3 pl.). —C. A. White, 'Saltatory origin of species.'— A. Eastwood, 'New Western plants.'

Gardeners' Chronicle (23 Aug.).—*Primula violodora* Dunn, sp. n. —(30 Aug.). 'George Don.'—(30 Aug., 6 Sept.). A. Henry, 'The genus *Astilbe*.' — (6 Sept.). *Crassula congesta* N. E. Br., sp. n.—(13 Sept.). *Mesembryanthum Mahoni* N. E. Br., sp. n.—(20 Sept.). *Kalanchoe diversa* N. E. Br., *Indigofera caudata* Dunn, *Desmodium amethystinum* Dunn, spp. nn. — A. Henry, '*Senecio clivorum* and allies' (plate).

Malpighia (xvi, fasc. 1; received 7 Sept.).—T. Ferraris, 'Flora micologica del Piemonte' (2 pl.).—A. Noelli, '*Aecidium Biscutellæ*, sp. n.'

Oesterr. Bot. Zeitschrift (Sept.). — J. Podpěra, 'Ueber das Vorkommen der *Avena desertorum* in Böhmen.'—G. Richen, 'Nachträge zur Flora von Vorarlberg und Liechtenstein.' — J. Freyn, 'Plantæ Karoanæ' (cont.). — J. Murr, 'Zur Kenntnis der Eu-Hieracien Tirols.'—B. Fleischer, '*Malva Zoernigi* (*neglecta* × *sylvestris*).'

Rhodora (Aug.).—M. L. Fernald, '*Taraxacum palustre* in America.' —G. E. Davenport, 'New England Ferns' (*Nephrodium*).

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* The dates assigned to the numbers are those which appear on their covers or title-pages, but it must not always be inferred that this is the actual date of publication.

BOOK-NOTES, NEWS, &c.

The Thirteenth Report of the Missouri Botanic Garden is mainly occupied by a revision of the *Yucceæ* by the Director, Mr. William Trelease, of which we hope to say more next month. A new genus, *Samuela*—dedicated by the author to his "little son Sam Farlow Trelease, who in the springs of 1900 and 1902 accompanied and materially aided me in a field study of this genus"—is based on *Yucca australis* Trelease (*Y. macrocarpa* Sargent), but receives a new specific name: what will the Rochester codists say to this? The volume is, as usual, profusely and admirably illustrated.

We are glad to notice an improvement in the spelling of the English notices in the *Botanisches Centralblatt*, but there is still abundant room for further advance. In no. 34, for example, Dr. E. A. L. Batters is disguised as "E. G. L. Balters," and the word "appeared" is divided into two equal parts. On another page of the same number, localities and authorities are indistinguishably printed—e. g. "*Oldenlandia rhodesiana* Salisbury, *Cynanchum præcox* Schlechter"—the former being a place and the latter a person. Prof. Bower's name appears among the editorial staff at the head of each number, and it may be suggested that proofs of the notices relating to English work should be referred to him or their author for revision.

The Rev. E. Paque, S.J., has published (Wesmael-Charlier, Namur) a *Flore analytique et descriptive des Provinces de Namur et de Luxembourg*. The work includes the commoner cultivated plants, and is illustrated by 341 not very satisfactory figures, apparently taken from various sources.

The *Flora Arctica*, edited by Dr. C. H. Ostenfeld—of which the first part, containing the Pteridophyta, Gymnospermæ, and Monocotyledones, by O. Gelert and C. H. Ostenfeld, has lately been published at Copenhagen, is to contain the whole of the Flowering Plants and Ferns of the Arctic Regions "north of the Wood boundary." The whole of Greenland is included, but Iceland and the Scandinavian Peninsula are left out. This of course makes some difference in the range in Europe and Asia; in the latter the Arctic vegetation is much less rich in species. The figures are mostly good, but it seems a pity that the examples selected for drawing should be from countries not included—*e. g.* Iceland, Norway, &c. We miss from the bibliography Sir J. D. Hooker's well-known paper on "Outlines of the Distribution of Arctic Plants" (Trans. Linn. Soc. xxiii. pp. 251–348, 1860). The printing is clear and distinct; the descriptions, so far as one can test them offhand, are distinctive and clear, and the keys decidedly helpful. With regard to the localities, probably if the herbaria of this country could have been consulted it would have resulted in many additions—thus *Potamogeton alpinus* Balb. occurs in Alaska; *P. perfoliatus* L. must come very near in America, "Lewis River, lat. 62°," &c. A curious slip occurs in a date at p. 72: "*C. gracilis* Curt. Fl. Lond. 1877–87, p. 282"—the date of this is about 1783. The volume, when completed, will be a valuable contribution to Arctic Botany.—A. B.

Yorks. (Scarborough, Filey, Whitby); Durham (Sunderland); Northumberland (Cullercoats, Almouth, Holy Island, Berwick); Isle of Man; Cheshire (Hilbre Island). Wales: Anglesea (Hilbre Island). Scotland: Berwicks. (Burnmouth, Eyemouth); Haddington (Dunbar, North Berwick); Edinburgh (Joppa); Fife (Kinghorn, Elie, Earlsferry); Forfar (Arbroath); Kincardine (Stonehaven); Aberdeen (Peterhead); Argyle (Firth of Lorne, &c.); Bute (Isles of Arran, Bute, and Cumbrae); Ayr (Ardrossan, Saltcoats); Dumbarton (Helensburgh). Ireland: Bantry Bay, Co. Cork; Dungarvan Bay, Co. Waterford; Wicklow; Howth, Balbriggan, &c., Co. Dublin; Strangford and Belfast Loughs, Co. Down; Antrim coast; Roundstone, Co. Galway; Kilkee, Co. Clare. Channel Islands (Jersey, Guernsey, Alderney, Sark). Common and abundant everywhere on the rocky parts of the British coast. — Var. *umbilicalis* J. Ag. Coasts of Cornwall (Falmouth); Devon (Torquay, Sidmouth); Dorset (Swanage); Kent (Sheerness); Northumberland (Holy Island, Berwick). Scotland: Haddington (Dunbar); Forfar (Arbroath); Bute (Isles of Cumbrae and Bute); Argyle (Loch Goil); Ayr (Portincross, Ardrossan); Orkney Islands. Ireland: Bantry Bay, &c. Channel Islands (Jersey). Common and abundant on our rocky shores.

P. amethystea Kütz. Coasts of Yorks. (Scarborough); Edinburgh (Joppa); Fife (Earlsferry); Forfar (Arbroath). Coast of Ireland. **Very rare.**

Subgenus Diploderma Rosenv.

P. miniata Ag. *α typica* Rosenv. Coasts of Northumberland (Berwick); Bute (Isle of Cumbrae); Orkney Islands (Kirkwall). Ireland: Murlough Bay and Cushendall, Co. Antrim. Locally abundant in spring and early summer, but hitherto recorded from only a few localities in Scotland and Northern England and Ireland.—*β amplissima* Rosenv. (= *Diploderma amplissimum* Kjellm.). Coast of Bute (Isle of Cumbrae). Ireland: Clontarf, Co. Dublin. Very rare. — *γ tenuissima* Rosenv. (= *D. tenuissimum* Strömf.). Coast of Bute (Isle of Cumbrae). Very rare. —*δ abyssicola* Rosenv. (= *Porphyra abyssicola* Kjellm.). Coasts of Bute (Isle of Cumbrae) and the Orkney Islands (Kirkwall). Locally abundant.

Suborder Euflorideæ.

Series Nemalioninæ Schm.

Fam. Helminthocladiaceæ Schm.

Tribe Acrochætieæ.

Gen. 152. Colaconema Batt., non Schm.

C. Bonnemaisoniæ Batt. Coasts of Devon (Plymouth) and Northumberland (Berwick). Very rare, and always parasitic in the fronds of *Bonnemaisonia asparagoides*.

C. reticulatum Batt. Coasts of Devon (Plymouth) and Donegal (Moville Bay). Very rare. Parasitic in the fronds of *Desmarestia Dresnayi*.

Gen. 153. Acrochætium Näg. (= Chantransia Schm., non Fries).

Obs.—As originally constituted by De Candolle, *Chantransia* was a mere assemblage of individuals without similarity of structure or reproductive function, including species of *Lemanea*, *Batrachospermum*, *Cladophora*, and *Œdogonium*. As reconstituted by Fries in 1825 (Syst. Orb. Veg. p. 338), with *Conferva chalybea* and *C. Hermani* for types, it does not differ in any essential particular from *Audouinella*, founded by Bory (Dict. Class. d'Hist. Nat. vol. iii. (1823), p. 340) two years earlier. Once more reformed by Schmitz (in Flora, 1889, p. 438), it is synonymous with *Acrochætium* Nägeli, Morph. und Syst. Ceram. p. 402 (1861). Under these circumstances it seems to me that either the name *Audouinella* must be substituted for *Chantransia* as that genus was understood by Thuret (*i. e.* to include both fresh-water forms, like *C. chalybea* and *C. Hermani*, and marine, like *C. corymbifera*, *C. efflorescens*, and *C. microscopica*), or, as seems preferable, to preserve the former name as that of a doubtful genus of fresh-water algæ, and to adopt Nägeli's genus *Acrochætium* for the reception of the well-understood marine forms.

α. Parasitic species.

A. entophyticum Batt. (= *Chantransia entophytica* Batt.). Coast of Devon (Plymouth). Very rare. Parasitic in the thallus of *Heterosiphonia plumosa*.

A. Chylocladiæ Batt. (= *Colaconema Chylocladiæ* Batt.). Coast of Devon (Plymouth, Torquay). Very rare. Parasitic in the thallus of *Chylocladia ovalis*.—f. *pulchra* Batt. Coast of Bute (Isle of Cumbrae). Parasitic in *Sertulariæ*.

A. endozoicum Batt. (= *Chantransia endozoica* Darbyshire). Coast of Northumberland (Alnmouth) and S.W. coast of Ireland (Valentia, Co. Kerry). Parasitic in species of *Alcyonidium*. Very rare.

β. Epiphytic species.

A. trifilum Batt. (= *Chantransia trifila* Buffham). Coasts of Devon (Plymouth) and Dorset (Swanage). Very rare.

A. microscopicum Näg. Coasts of Cornwall (Kynance Cove); Devon (Torquay); Northumberland (Berwick). Very rare.

A. sparsum Batt. (= *Callithamnion sparsum* Carm.). Coasts of Cornwall (Mount's Bay); Sussex (Brighton); Durham (Roker). Scotland: Haddington (Dunbar); Fife (Earlsferry); Kincardine (Bay of Nigg); Orkney Islands (Kirkwall); Argyle (Appin). Ireland: Miltown Malbay, Co. Clare. Rare.

A. mirabile Näg. (= *Callithamnion mirabile* Kütz.). Coast of Dorset (Swanage). Rare.

A. cæspitosum Näg. (= *Callithamnion cæspitosum* J. Ag.). Coast of Dorset (Swanage).

A. virgatulum J. Ag. (= *Callithamnion virgatulum* Harv.). Coasts of Cornwall (Trevone Bay, St. Minver, Falmouth, Looe, Tor Point); Devon (Plymouth, Torquay, Ladran Bay, Sidmouth); Dorset (Weymouth, Swanage); Sussex (Brighton); Kent (Dover); Yorks. (Filey, Scarborough); Durham (Sunderland); Northumberland (Alnmouth, Berwick); Isle of Man; Cheshire (Hilbre Island, Eastham). Wales:

Anglesea (Puffin Island). Scotland: Haddington (Dunbar); Fife (Kinghorn); Forfar (Arbroath); Orkney Islands (Kirkwall Bay, Skaill); Argyle (Loch Etive); Bute (Isles of Arran and Cumbrae); Ayr (Largs, Skelmorlie). Ireland: Bantry Bay, Co. Cork; Antrim coast; Roundstone Bay, Co. Galway. Channel Islands (Jersey, Alderney). Not uncommon.

A. secundatum Näg. Coasts of Cornwall (Mount's Bay, Looe); Devon (Plymouth, Torquay, Sidmouth); Dorset (Swanage); Kent (Folkestone); Norfolk (Yarmouth); Northumberland (Holy Island, Scremerston, Berwick). Wales: Anglesea (Puffin Island). Scotland: Haddington (Dunbar, North Berwick); Edinburgh (Joppa, Caroline Park); Fife (Elie, Earlsferry); Orkney Islands (Skaill); Argyle (Loch Etive, Appin); Bute (Isles of Cumbrae and Arran); Ayr (Fairlie, Ardrossan, Saltcoats). Ireland: Miltown Malbay, Co. Clare. Common.

A. luxurians Näg. (= *Callithamnion luxurians* J. Ag.). Coasts of Cornwall (Mount Edgcumbe); Dorset (Weymouth, Swanage). Channel Islands (Guernsey). Rare.

A. Daviesii Näg. (= *Callithamnion Daviesii* Harv.). Coasts of Cornwall (Trevone Bay, Mount's Bay, Flushing, Falmouth, Looe); Devon (Plymouth, Torquay, Sidmouth, Ilfracombe); Dorset (Swanage); Hants (Isle of Wight); Sussex (Brighton); Norfolk (Weybourne); Yorks. (Filey); Durham (Sunderland); Northumberland (Holy Island, Berwick); Isle of Man. Wales: Anglesea (Puffin Island). Scotland: Fife (Elie, Kinghorn); Orkney Islands (Skaill); Kincardine (Stonehaven); Argyle (Loch Etive); Bute (Isles of Cumbrae and Arran); Ayr (Largs). Ireland: Bantry Bay, Co. Cork; Clontarf, Co. Dublin, &c. Channel Islands (Jersey, Guernsey, Alderney). Not uncommon.

A. efflorescens Näg. (= *Callithamnion efflorescens* J. Ag.). Coast of Dorset (Swanage, Aug. 1894, E. A. B.). Epiphytic on *Dudresnaya verticillata* and *Naccaria Wigghii*. Rare.

A. corymbiferum Batt. (= *Chantransia corymbifera* Thur.). West coast of Ireland (Kilkee, Co. Clare. Epiphytic on *Helminthocladia purpurea*, 1846, W. H. Harvey in Herb. Pollexfen).

Tribe Nemalieæ Schm.

Gen. 154. Nemalion Targioni-Tozzetti.

N. elminthoides Batt. (= *Fucus elminthoides* Velley in Withering, Botan. Arrang. ed. 2, vol. iii. p. 255, pl. xvii. fig. 2 (1792), e spec. auth. in Herb. Kew.; *Fucus Nemalion* Bertolini, Amoenit. Ital. pl. 5, fig. 9 (1819); *Nemalion lubricum* Duby, Bot. Gal. p. 959 (1830); *N. multifidum β simplex* Harv. Phyc. Br. pl. xxxvi.). Coasts of Cornwall (Scilly Islands, Land's End, Falmouth); Devon (Torquay, Exmouth); Dorset (Portland, Durlston Head, Swanage). Scotland: Ayr (Portincross); Moray Firth. Channel Islands (Alderney). Local.

N. multifidum J. Ag. Coasts of Cornwall (Trevone Bay, St. Minver, Padstow, Falmouth, Pridmouth, Cawsand Bay, Whitsand Bay); Devon (Bovisand Bay, Torquay); Dorset (Portland, Weymouth, Swanage). Scotland: Bute (Isles of Arran and Bute);

Argyle (Machrihanish Bay); Orkney Islands. Ireland: Bantry Bay, Co. Cork; Balbriggan and Killiney, Co. Dublin; Downshire coast; Kilkee and Miltown Malbay, Co. Clare. Channel Islands (Alderney). Rather rare.

Gen. 155. Helminthocladia J. Ag. (non Harv.).

H. purpurea J. Ag. (= *Nemalion purpureum* Chauv.). Coasts of Cornwall (Whitsand Bay); Devon (Torquay, Exmouth, Sidmouth); Sussex (Brighton); Isle of Man (*fide* Talbot). Ireland: Balbriggan and Ireland's Eye, Co. Dublin; Kilkee and Miltown Malbay, Co. Clare. Channel Islands (Guernsey). Very rare.

H. Hudsoni J. Ag. Coasts of Cornwall (Whitsand Bay) and Devon (Exmouth).

Gen. 156. Helminthora J. Ag.

H. divaricata J. Ag. (= *Dudresnaya divaricata* Harv. Phyc. Br. pl. cx.). Coasts of Cornwall (St. Minver, Scilly Islands, Mount's Bay, Falmouth, Pridmouth, Whitsand Bay); Devon (Plymouth, Bovisand, Torquay, Sidmouth); Dorset (Portland, Weymouth, Swanage, Poole); Sussex (Brighton). Wales: Anglesea (Aberffraw). Scotland: Kincardine (Bay of Nigg); Aberdeen (Peterhead); Banff (Gamrie); Elgin (Lossiemouth); Orkney Islands (Skaill); Argyle (Appin); Bute (Arran); Ayr (Saltcoats, Ardrossan). Ireland: Bantry, Co. Cork; Killiney and Howth, Co. Dublin; Antrim and northern coast generally; Roundstone, Co. Galway; Kilkee, Co. Clare. Channel Islands (Jersey, Guernsey, Alderney). Locally abundant, but not generally distributed.

Fam. Chætangiaceæ Schm.

Tribe Scinaieæ Schm.

Gen. 157. Scinaia Bivona.

S. furcellata Bivona (= *Ginnania furcellata* Mont.). Coasts of Cornwall (Scilly Islands, Mount's Bay, Penzance); Devon (Torcross, Torquay, Dawlish, Exmouth, Budleigh Salterton, Sidmouth); Dorset (Weymouth, Studland); Hants (Isle of Wight, Southampton); Sussex (Worthing, Brighton); Suffolk (Felixstowe, Corton near Lowestoft); Norfolk (Yarmouth, Sheringham, Cromer). Scotland: Orkney Islands (Deer Sound); Bute (Isles of Arran and Cumbrae). Ireland: Bantry Bay, Co. Cork; Howth, Co. Dublin; Portaferry and Strangford Lough, Co. Down; north side of Belfast Lough and Glenarm Bay, Co. Antrim; Roundstone Bay, Co. Galway; Quilty Strand, Miltown Malbay, Co. Clare. Channel Islands (Jersey, Guernsey, Alderney). Rather rare. — f. *subcostata* J. Ag. Coasts of Devon (Sidmouth), Bute (Isle of Cumbrae), and Cork (Bantry Bay). Rare.

Tribe Chætangieæ Schm.

Gen. 158. Choreocolax Reinsch.

C. polysiphoniæ Reinsch. Coasts of Devon (Plymouth); Kent (Folkestone); Northumberland (Berwick). Scotland: Bute (Isle of Cumbrae); Ayr (Fairlie, Saltcoats). Ireland: Dungarvan Bay,

Co. Waterford. Channel Islands (Guernsey, June, 1902, Mrs. A. Hamber). Not uncommon parasitic on the fronds of *Polysiphonia fastigiata*.

C. tumidus Reinsch. Coasts of Northumberland (Berwick) and Bute (Isle of Cumbrae). Probably not uncommon parasitic on the fronds of *Ceramia*, *Cystoclonium purpureum*, &c.

Fam. Gelidiaceæ Schm.

Tribe Harveyelleæ Schm.

Gen. 159. Harveyella Schm. & Rke.

H. mirabilis Schm. & Rke. Coasts of Dorset (Lyme Regis, Charmouth, Weymouth); Hants (Isle of Wight); Kent (Deal); Essex (Clacton); Northumberland (Berwick). Scotland: Ayr (Fairlie). Not uncommon parasitic on the fronds of *Rhodomela subfusca*.

H. pachyderma Batt. (= *Choreocolax pachydermus* Reinsch.; *C. albus* Kuck.). Coasts of Devon (Torquay, Sidmouth); Hants (Gosport). Parasitic on the fronds of *Gracilaria confervoides*. Rare.

Tribe Wrangelieæ Schm.

Gen. 160. Atractophora Crn.

A. hypnoides Crn. Coasts of Devon (Exmouth); Dorset (Weymouth, Swanage). Channel Islands (Jersey). Very rare.

Gen. 161. Naccaria Endl.

N. Wigghii Endl. Coasts of Cornwall (Mount's Bay, Falmouth, Fowey, Mount Edgcumbe); Devon (Plymouth, Bovisand, Torquay, Slapton, Exmouth, Sidmouth); Dorset (Weymouth, Swanage); Hants (Shanklin, I. W.); Sussex (Brighton); Kent (Folkestone); Norfolk (Yarmouth, Runton); Isle of Man. Scotland: Argyle (Campbeltown, Machrihanish Bay); Bute (Isle of Cumbrae); Ayr (Fairlie, Ayrheads). Ireland: Bantry Bay, Co. Cork; Wicklow; Belfast Lough, Kilkee, Co. Clare. Channel Islands (Jersey, Guernsey). Rare.

Tribe Gelidieæ Schm.

Gen. 162. Pterocladia J. Ag.

P. capillacea Born. (= *Gelidium corneum* vars. ε *capillaceum*, δ *uniforme*, et γ *pinnatum* Grev.). Coasts of Cornwall (St. Minver, Mount's Bay, King's Cove, Mount Edgcumbe); Devon (Ilfracombe, Torquay, Dawlish, Exmouth, Sidmouth); Hants (Isle of Wight); Yorks. (Scarborough). Scotland: Isle of Bute. Ireland.

Gen. 163. Gelidium Lamour.

G. crinale J. Ag. α *genuinum* Hauck (= *G. corneum* var. *crinale* Auct.). Coasts of Cornwall (St. Minver, Kilmouth, Looe); Devon (Ilfracombe, Torbay, Sidmouth); Dorset (Weymouth, Lulworth, Swanage); Hants (Isle of Wight); Sussex (Bognor, Brighton, Eastbourne); Norfolk (Cromer); Northumberland (Holy Island, Berwick); Cheshire (Hilbre Island); Isle of Man. Scotland: Berwicks. (Burnmouth); Fife (Earlsferry, Elie); Bute (Isles of

Arran, Bute, and Cumbrae); Ayr (Fairlie, Saltcoats). Ireland: Belfast Bay, &c. Channel Islands (Jersey). Not uncommon.—*β lubricum* Hauck (= *Acrocarpus lubricus* Kütz.). Coasts of Dorset (Swanage, Sept. 1894, and Studland, Sept. 1898, E. A. B.); Sussex (Brighton, J. Miles, Dec. 1889). Rare. — *γ spathulatum* Hauck (= *Acrocarpus spathulatus* Kütz.). Coasts of Devon (Torquay) and Bute (Isle of Cumbrae). Rare.—*δ polycladum* Hauck (= *Gelidium polycladum* Kütz.). Coasts of Haddington (Dunbar) and Bute (Cumbrae). Rare.

G. pusillum Le Jol. (= *G. corneum* var. *clavatum* Grev. et var. *cæspitosum* J. Ag.). Coasts of Somerset (Clevedon, Minehead); Cornwall (St. Michael's Mount, Mount's Bay); Devon (Plymouth, Torquay, Sidmouth); Dorset (Weymouth, Swanage, Studland); Sussex (Brighton); Durham (Marsden); Northumberland (Alnmouth, Bamborough, Berwick). Scotland: Edinburgh (Caroline Park); Fife (Earlsferry); Orkney Islands (Kirkwall Bay); Argyle (Appin); Bute (Isle of Cumbrae). Ireland: Roundstone Bay, Co. Galway. Common on the southern shores of England (and Ireland?); much rarer on those of Northern England and Scotland.

G. aculeatum (= *G. corneum* var. *aculeatum* Grev.). Coasts of Cornwall (Scilly Islands, Mount's Bay, Falmouth, Pridmouth); Devon (Ilfracombe, Torbay); Northumberland (Holy Island). Scotland: Bute (Isle of Cumbrae). Rare. — Var. *abnorme* Batt. (= *G. corneum* var. *abnorme* Grev.). Coasts of Cornwall (Mount's Bay); Devon (Ilfracombe, Torquay). Scotland: Bute (Isle of Cumbrae). Rare.

G. pulchellum Kütz. *α genuinum* Batt. (= *G. corneum* var. *pulchellum* Grev.; *Fucus corneus* var. *pulchellus* Turn. Hist. Fuc. t. 257, f. p.). Coasts of Cornwall (Falmouth); Devon (Torquay); Suffolk (Felixstowe). Scotland: Bute (Port Bannatyne). Ireland: Bantry Bay and Youghal, Co. Cork; Roundstone Bay, Co. Galway. Channel Islands (Guernsey). Rare. — *β setaceum* Batt. (= *G. corneum* var. *setaceum* Kütz. Tab. Phyc. xviii. tab. 54). Coast of Galway (Roundstone Bay). Channel Islands (Guernsey). Rare.—*γ clavifer* Batt. (= *G. corneum* var. *clavifer* Grev.). Coasts of Dorset (Portland) and Cork (Bantry Bay). Rare.

G. attenuatum Thur. (= *G. corneum* var. *attenuatum* Hook.). Coasts of Devon (Paignton, Torquay, Sidmouth) and Dorset (Weymouth, Swanage, Studland). Rare. — *β confertum* Batt. (= *G. corneum* var. *confertum* Grev.). Coasts of Cornwall (Falmouth); Devon (Paignton, Sidmouth); Northumberland (Black Rocks, Bamborough); Bute (Isles of Bute and Cumbrae). Rare.

G. corneum Lamour. Coasts of Cornwall (Trevone Bay); Dorset (Swanage); Hants (Isle of Wight); Sussex (Brighton); Isle of Man. Wales: Anglesea (Puffin Island). Scotland: Edinburgh (Caroline Park, Joppa); Orkney Islands; Argyle (Loch Etive); Bute (Isles of Arran and Cumbrae); Ayr (Ayrheads). Ireland: Roundstone Bay, Co. Galway; Miltown Malbay, Co. Clare, &c. Channel Islands (Jersey, Guernsey, Alderney). Not common.

G. latifolium Born. (= *G. corneum* var. *latifolium* Grev.; var. *plumula* Kütz.). Coasts of Cornwall (Mount's Bay, St. Mawes,

Fowey); Devon (Tor Abbey, Sidmouth); Dorset (Weymouth, Swanage). Scotland: Bute (Isles of Cumbrae and Bute); Ayr (Girvan). West coast of Ireland (Roundstone Bay, Miltown Malbay, &c.). Channel Islands (Jersey, Guernsey). Probably not uncommon. — *β Hystrix* Hauck (= *G. corneum γ Hystrix* J. Ag.). Coast of Dorset (Weymouth, Aug. 1900, E. A. B.). — *γ laciniata* Batt. (= *G. corneum* var. *laciniatum* Kütz.). Coast of Devon (Tor Abbey, March, 1883, E. M. Holmes).— *δ flexuosum* Batt. (= *G. corneum* var. *flexuosum* Harv.). Coasts of Cornwall (Mount Edgcumbe) and Devon (Torquay).

G. sesquipedale Thur. (= *G. corneum* var. *sesquipedale* Grev.). Coast of Devon (Torquay, Sidmouth). Rare.

G. melanoideum var. *filamentosa* Shousb. Coasts of Sussex (Hastings) and Northumberland (Alnmouth). Very rare.

Series Gigartininæ Schm.

Fam. Gigartinaceæ Schm.

Tribe Gigartineæ Schm.

Gen. 164. Chondrus Stackh.

C. crispus Stackh. Coasts of Cornwall (St. Minver, Padstow, Mount's Bay, Falmouth, Looe); Devon (Plymouth, Torquay, Sidmouth, Ilfracombe); Dorset (Weymouth, Swanage); Hants (Isle of Wight); Sussex (Brighton, Hastings); Kent (Folkestone, Deal); Essex (Harwich, Dovercourt); Suffolk (Felixstowe); Yorks. (Scarborough); Durham (Sunderland); Northumberland (Cullercoats, Alnmouth, Holy Island, Berwick); Cheshire (Eastham, Hilbre Island); Isle of Man. Wales: Anglesea (Puffin Island). Scotland: Berwicks. (Burnmouth, Eyemouth); Haddington (Dunbar, Longniddry); Edinburgh (Joppa); Fife (Elie, Earlsferry); Forfar (Arbroath); Kincardine (Stonehaven); Aberdeen (Peterhead); Orkney and Shetland Islands; Argyle (Loch Etive, &c.); Bute (Isles of Arran and Cumbrae); Ayr (Portincross, &c.). Ireland: Bantry, Co. Cork; Wicklow; Balbriggan, Co. Dublin; Belfast Lough, Co. Down; Roundstone, Co. Galway; Kilkee, Co. Clare. Channel Islands (Jersey, Guernsey, Alderney, Sark). Very common on all rocky parts of the British coast. — *β virens* (Turn.). Coasts of Cornwall, Devon, and Dorset. Not uncommon.—*γ stellatus* (Turn. pro parte). On most parts of the British coast, very common. —*δ æqualis* (Turn. pro parte). Cornwall (Falmouth); Devon (Sidmouth, Torquay); Dorset (Weymouth, Swanage); Northumberland (Holy Island, Berwick); Orkney Islands, &c. Common.— *ε filiformis* (Turn.). Coasts of Devon (Sidmouth, Torquay); Dorset (Swanage); Sussex (Worthing, Brighton); Durham (Seaton, &c.). Not uncommon. — *ζ patens* (Turn.). Devon (Torquay); Dorset (Weymouth). Channel Islands, &c. Not uncommon.—*η Sarniensis* (Turn.). Dorset (Weymouth). Channel Islands (Guernsey, Alderney). Rather rare.—*θ lacerus* (Turn.). Devon (Torquay, Sidmouth). Orkney Islands (Kirkwall). Channel Islands (Guernsey). Rather rare. — *ι planus* (Turn.). Coasts of Devon (Torquay, Sidmouth, Lynmouth); Dorset (Weymouth); Sussex (Hastings). Orkney Islands (Kirkwall). Not uncommon.

Gen. 165. Gigartina Stackh.

G. Teedii Lamour. Coasts of Devon (Elberry Cove, Torbay) and the Channel Islands (Jersey). Very rare.

G. acicularis Lamour. Coasts of Cornwall (Mousehole); Devon (Ilfracombe, Plymouth, Bovisand, Lupton Cove, Torquay, Sidmouth); Hants (Isle of Wight). Ireland: Valentia, Co. Kerry; Dungarvan Bay, Co. Waterford; Belfast Bay, Co. Down; Kilkee, Co. Clare. Channel Islands (Jersey, Guernsey, Alderney). Very rare.

G. pistillata Stackh. Coasts of Cornwall (Scilly Islands, St. Minver, Padstow, St. Ives, Mount's Bay, Penzance, Lizard, Whitsand Bay) and the Channel Islands (Jersey, Guernsey, Alderney). Very rare.

G. stellata Batt. (= *Fucus stellatus* Stackhouse in Withering, Bot. Arr. ed. 3, vol. iv. p. 99, excl. syn. omn. (1796), e spec. orig. in Herb. Linn. Soc.; *F. mamillosus* Good. & Woodw. in Linn. Soc. Trans. vol. iii. p. 174 (1797); *Gigartina mamillosa* J. Ag.). (*Note.*—Withering gives the following very accurate account of this species:—"F. cartilaginous, forked, greatly widening upwards; surface thick-set with excrescences bearing fructifications on their extremities. Plant 4 inches high, beautifully hedge-hogged with excrescences, sometimes on one, sometimes on both surfaces. They are upright, partly cylindrical, fleshy, bearing the fructifications embedded in their tops. Its colour is brown, purple, or bright green.—Mr. Stackhouse." While the second fasciculus of his *Nereis Britannica* was "under preparation for the press," Stackhouse supplied Withering with "references to the plates and likewise with characters and specimens of the nondescript species" it was to contain. Withering published descriptions of these "nondescripts" in the third edition of his *Systematic Arrangement of British Plants* (*vide* vol. iv. p. 101), which appeared in 1796, the year before the publication of *Observations on the British Fuci* by Goodenough and Woodward. He, however, makes no mention of Stackhouse's *Fucus echinatus*, a figure of which appears side by side with that of *F. stellatus* on Plate xii. of the *Nereis;* and it seems, from the above quoted description, that he rightly considered it identical with *F. stellatus*. I have examined the specimen of his *F. stellatus* presented to the Linnean Society by Stackhouse, and it undoubtedly belongs to the present species, the fronds being covered with the characteristic cystocarps.) — f. *genuina* (= *F. echinatus* Stackh.). Coasts of Somerset, Cornwall, Devon, Dorset, Hants, Sussex, Kent, Yorks., Durham, Northumberland, Cheshire, Isle of Man, Wales, Scotland, Ireland, and the Channel Islands. Common. —f. *acuta* Good. & Woodw. (incl. f. *linearis* Turn.). Coasts of Cornwall (Falmouth); Devon (Sidmouth); Kent (Deal); Northumberland (Berwick). Not uncommon. — f. *prolifera* Turn. (incl. f. *stellata* Turn.). Coasts of Cornwall (Falmouth, Looe), Kent (Folkestone), &c. Not uncommon. — f. *incurvata* (Turn.). Coasts of Devon, Cornwall, and Dorset (Weymouth). Rather rare.

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JAMES BRITTEN, K.S.G., F.L.S.

THE JOURNAL OF BOTANY was established in 1863 by Dr. Seemann. In 1872 the editorship was assumed by the late Dr. Trimen, who, assisted during part of the time by Mr. J. G. Baker and Mr. Spencer Moore, carried it on until the end of 1879, when he left England for Ceylon. Since then it has been in the hands of the present Editor.

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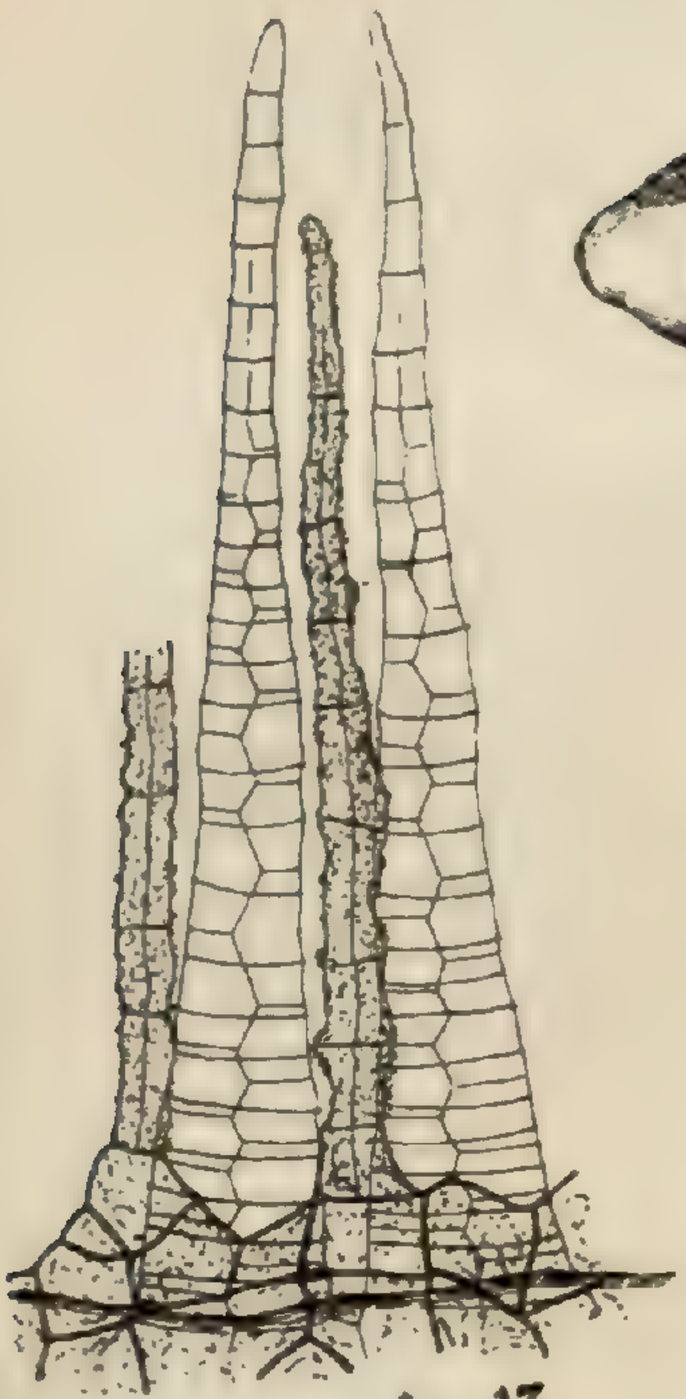

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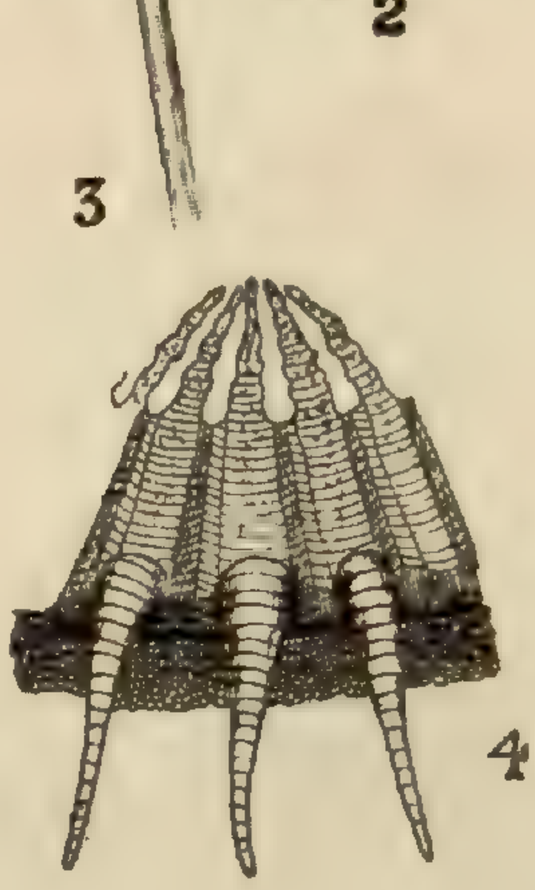

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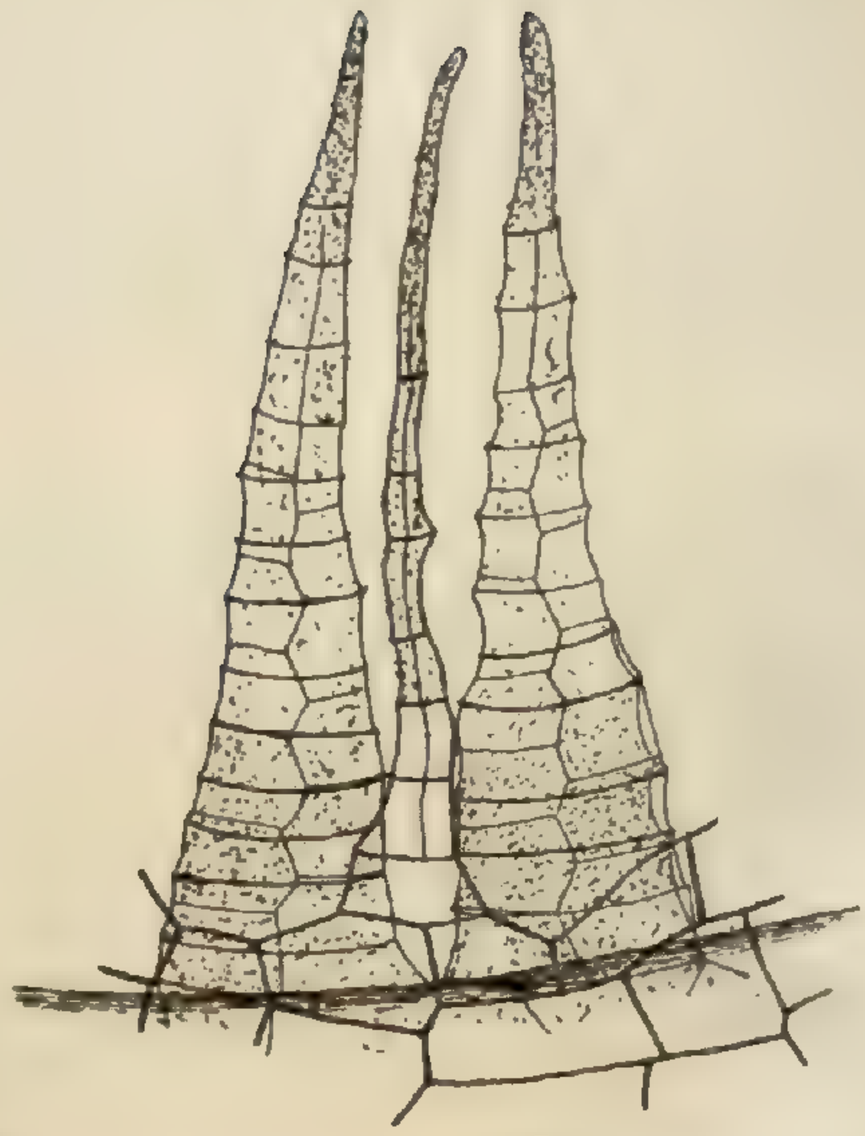

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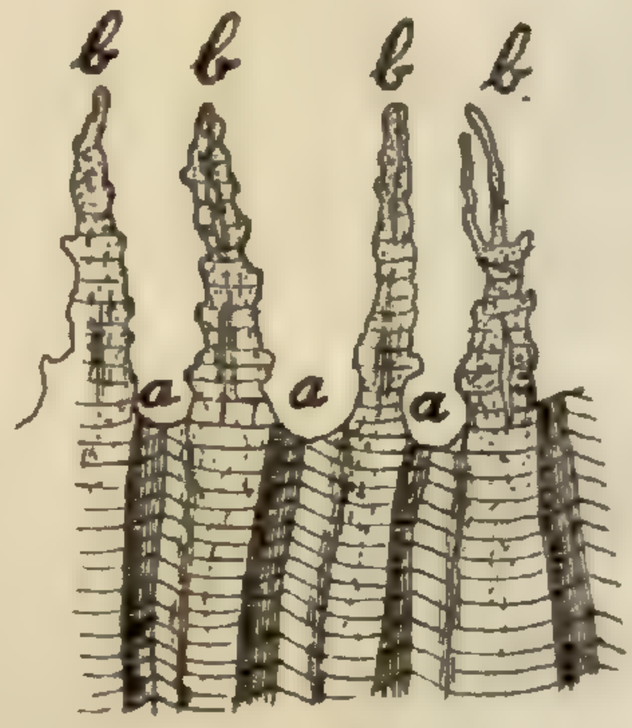

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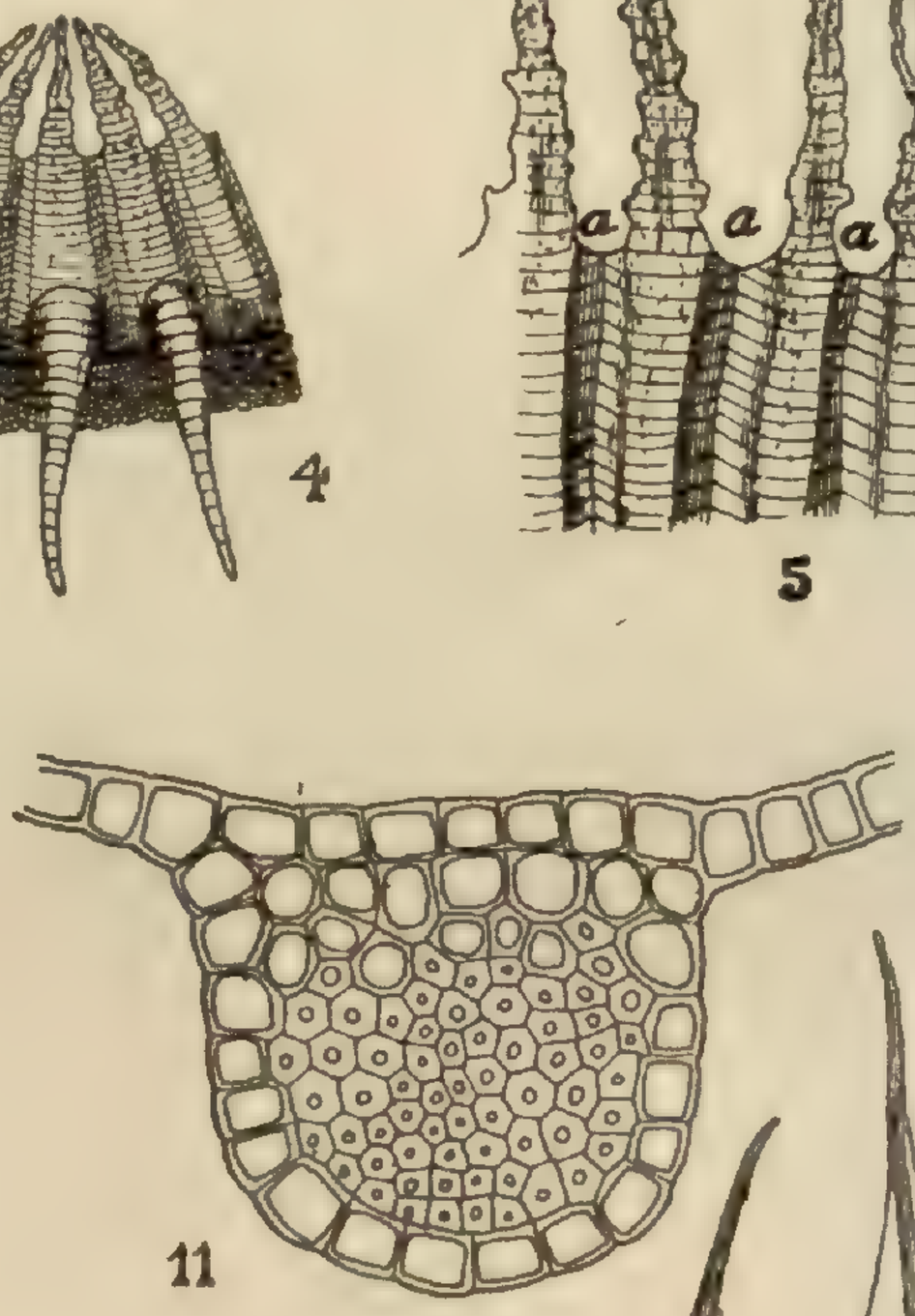

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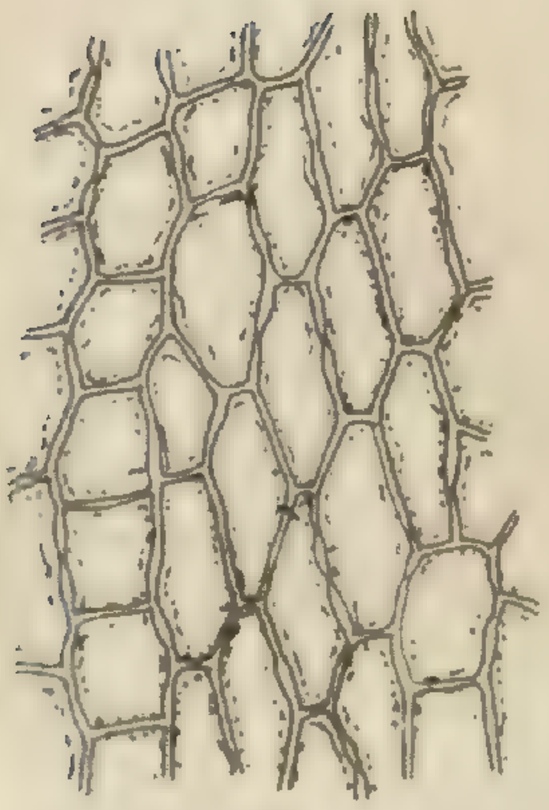

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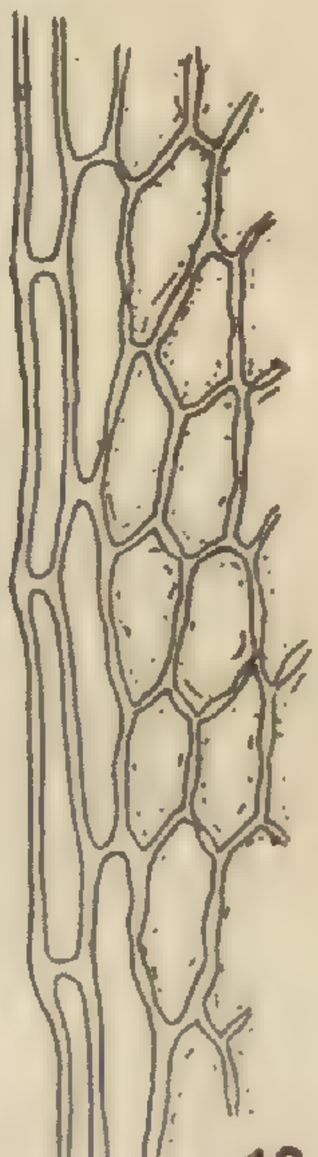

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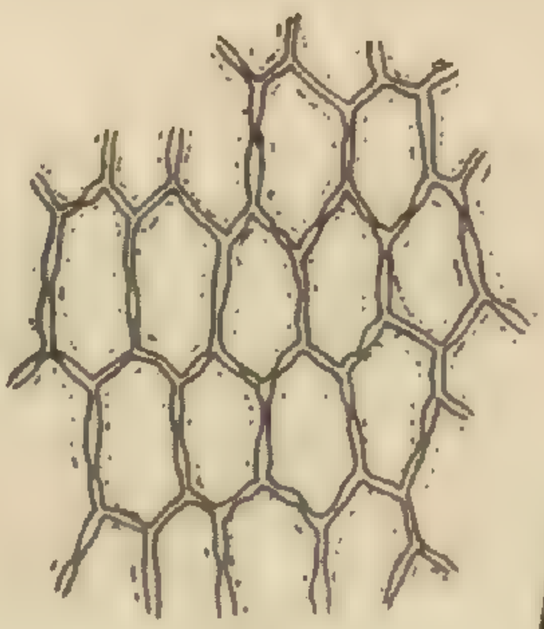

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BRYOLOGICAL NOTES.

By Ernest S. Salmon, F.L.S.

(Continued from p. 279.)

(Plate 443.)

(28). The Genus Osculatia & Bryum (Dicranobryum) globosum.

In 1859 De Notaris, in a paper entitled "Musci Napoani sive Muscorum ad flumen Napo in Columbia a clarissimo Osculati lectorum Recensio" (in Mem. Accad. Sci. Torino, ser. II. xviii. 445), founded a genus of mosses with these characters:—"*Osculatia* n. gen. Flores dioici terminales. Capsula alte pedunculata, sphæroidea, lævis, annulata, operculataque. Peristomium simplex. Dentes sedecim lineari-subulati, trabeculati, integri, conniventes e membrana basilari homogenea, annuli latitudinem æquante oriundi. Flos masculus gemmiformis. Plantula facie, forma et directione capsulæ subhorizontali, contextu foliorum *Catoscopium* quadantenus similis, sed statura longe majore, rigiditate foliorum fere polytrichoidea, in *Meesiacearum* familia insignis, annuenteque celeberrimo systematis naturalis muscorum frondosorum conditore, W. Ph. Schimper, typum novi generis *Catoscopium* cum *Meesiis* nectens præbens, quod strenuo Columbiæ superioris peregrinatori, deque Historia naturali optime merito nuncupandum esse constitui."

In this genus a single species, *O. columbica* De Not., is described and figured. Since 1859 nothing further, apparently, has been known about this moss. *Osculatia*, with its single species, is maintained as a genus of the family *Meesieæ* by Jaeger (Adumbr. i. 516, & ii. 698), and by Paris (Index Bryolog.); it is not mentioned, so far as I can find, in Müller's *Genera Muscorum Frondosorum*.

Schimper's herbarium at Kew contains a specimen of the present moss, sent by De Notaris to Schimper. It is labelled "*O. columbica* De Notar. herb. In Columbia Superiore ad Fl. Napo. Legit Osculati." The material consists of two stems bearing immature capsules, several stems with setæ but without capsules, and a few barren stems. There is also a tracing of a drawing (with "peristom. *Osculatiæ*" written beneath) representing a simple peristome of sixteen teeth. This is the same drawing which appears as fig. 7, tab. vi. in De Notaris's published account of the species. On dissecting one of the capsules of this specimen, it was found that the peristome was far too immature to allow of its structure being studied. I then obtained on loan, through the courtesy of Prof. R. Pirotta, the type-specimen of *O. columbica* from De Notaris's herbarium at the R. Istituto ed Orto botanico di Roma. The type-specimen consists of a stem bearing one capsule, a few stems with setæ but without capsules, and a few barren stems. Not having permission to dissect the single capsule, I endeavoured to ascertain from the other characters shown by the plant—habit, shape of cap-

sule, and vegetative characters—if it really differed generically from other South American mosses. An examination of the areolation of the leaves convinced me that the plant could not belong to the *Meesiaceæ*, as De Notaris and Schimper supposed; as, although the cells in the lower part of the leaf are here and there shortly rectangular or subquadrate, those in the upper part of the leaf are distinctly hexagonal (*cfr.* fig. 9). This upper areolation, and the shape of the leaf with its recurved margins, strongly suggested affinity with *Bryaceæ*. On looking through the descriptions of the species of *Bryum* given in Mitten's *Musci Austro-americani,* I found a plant (in the subsection *Dicranobryum* of the genus) described as follows:—"*B. globosum* Mitt. Cæspitosum; caulis brevis, rigidus. Folia erecto-patentia, lanceolata, subulata, rigida, nervo crasso pungente excurrente, integerrima, cellulis fere omnibus parvis rhombeis; perichætialia conformia. Theca in pedunculo elongato inclinata, globoso-ovalis, collo brevissimo, ore parvo, operculo hemisphærico, peristomii interni processibus in membrana ad dentium medium exserta impositis. Hab. Andes Quitenses, in sylva Canelos loco Pueblo de Los Jibaros (3000 ped.) Spruce nr. 312. Caulis ½ unciam altus. Folia lineam longa, rigida. Pedunculus 1½ unciam longus, gracilis. Habitus *B. Montagneani* Indiæ orientalis, sed majus et inter Americanas species distinctissima." From the clear description here given, I felt little doubt that Mitten must have had under observation De Notaris's plant, and on comparing specimens of the latter with the examples of *B. globosum* in the Kew Herbarium, the identity of the two was apparent. Further, a study of the specimens of *B. globosum* showed clearly that the plant was not generically distinct from *Bryum*, but belonged to the section *Brachymenium* of that genus.

The structure of the inner peristome, which is well seen in the capsules of Spruce's collecting (nr. 312) is rather curious. The membrane of the inner peristome extends to beyond half the length of the teeth of the outer peristome; this basal membrane, seen under a low magnification, is pale fuscous, with longitudinal bands of a darker and brighter fuscous colour at regular distances (see figs. 4, 5). Under a higher magnification these longitudinal bands are seen to be composed of keeled ridges of the membrane, the keel being directed towards the *outside*. These brighter-coloured keeled longitudinal bands alternate with the outer teeth of the peristome, and from their position, and the manner in which they are keeled, evidently represent the remains—*i. e.* the lower part—of the teeth of the inner peristome; at their apex (fig. 5*a*), however, they give rise to no tooth-like prolongation, but are invariably truncate. Opposite each tooth of the outer peristome the membrane of the inner peristome gives rise to a tooth-like process (fig. 5*b*) which is concave or keeled, the concavity or the keel being directed towards the *inside*. Each process is split at the apex into two or three divisions. The inner peristome therefore agrees in its type of structure with that of the section *Brachymenium* of *Bryum*, which is described by Müller (Syn. i. 242) as follows: "membrana interna dentibus rudimentariis, vel nullis et ciliis perfectis seu rudimentariis."

The keeling of the basal membrane of the inner peristome in bands alternating with the teeth of the outer peristome is found in *B. Montagneanum* C. M., but the processes of the inner peristome are not in this species developed so strongly as to resemble teeth.

The present plant should therefore bear the name *Bryum* (*Brachymenium*) *columbicum* (De Not.). The following description is drawn up from examination of the material mentioned above. I have not seen the male plant, and quote therefore the description given by De Notaris:—

BRYUM (BRACHYMENIUM) COLUMBICUM (De Not.).

Osculatia columbica De Not. in Mem. Accad. Sci. Torino, ser. II. xviii, 445, tab. vi. (1859); Jaeger, Adumbr. i. 516 (1875); ii. 698 (1879); Paris Index Bryolog. (Actes Soc. Linn. Bordeaux, l. 192) (1896).

Bryum (*Dicranobryum*) *globosum* Mitt. Musc. Austr. Amer. 289 (1869).

Brachymenium globosum (Mitt.) Jaeger, Adumbr. i. 112 (1875); Paris Index Bryolog. (Actes Soc. Linn. Bordeaux, xlvi. 132) (1893).

HAB. Amer. Austr.; Ecuador:—"In Columbia Superiore ad Fl. Napo" (Osculati), c. fr.!; Andes Quitenses, in sylva Canelos loco Pueblo de Los Jibaros (3000 ped.) (Spruce, Musc. Amazon. et And. nr. 312), c. fr.!

"Dioicum" (teste De Notar.), cæspitosum, rigidiusculum, fuscum, caule breviusculo erecto ad 2 cent. alto simplice vel ob innovationes breves infra perichætium orientes dichotome diviso inferne radiculoso, foliis caulinis confertis patentibus (inferioribus interdum subpatulis) siccitate erectis vel subadpressis rigidis lanceolatis vel e basi latiore oblongo-lanceolatis acuminatis 3–3·5 mill. longis nervo crasso rufescente dorso valde prominente excurrente longe cuspidatis concavo-carinatis margine utroque e basi fere ad apicem recurvo integerrimo vel infra folii summum apicem obsolete denticulato, cellulis inferioribus breviter rectangulari-subhexagonis circ. 20–30 × 18–20 μ superioribus longioribus angustioribus hexagonis et subhexagonis circ. 30 × 13 μ omnibus lævibus ætate parietibus plus minus porosis, cellulis marginalibus folii apicem versus longioribus anguste rectangularibus limbum unistratosum perangustum indistinctum efformantibus, foliis perichætialibus caulinis erectioribus longioribus nervo longius excurrente aristato-cuspidatis, capsula in pedunculo elongato 3·5–5·5 cent. alto gracili purpureo superne sinistrorso inferne dextrorso circa axem idealem torto inclinata e basi brevissime attenuata in pedunculum defluente globoso-ovali operculata 2·5–3 mill. longa 1·5–2 mill. lata asymmetrica lævi fusca pachydermatica ore angustato basi stomatibus superficialibus numerosis instructa annulata, annulo lato revolubili, peristomii externi dentibus sedecim conniventibus lanceolatis dense trabeculatis inferne rubris superne pallide lutescentibus e membrana basilari distincta pallescente oriundis, interni dentibus nullis processibus dentiformibus dentibus exterioribus oppositis apice bi–tri-fidis in membrana supra dentium medium exserta impositis, operculo hemi-

sphærico obtuso vel plus minus distincte apiculato, sporis globosis minutissime asperis 15–18 μ diam., calyptra ignota.

"Plantæ masculæ femineis mixtæ iisdemque similes. Flos gemmiformis. Perigonialia exteriora ovata, nervo longe cuspidata, intima antheridia circumientia multo minora, tenuioraque, valde concava, fuscescentia. Antheridia numerosa obverse oblonga. Paraphyses subnullæ" (teste De Notar.).

(29). Schwetschkea C. Müll. in Linnæa, xxxix. 429 (1875).

Müller (*l. c.*) founded the above genus with the following characters:—"Peristomium duplex; dentes externi 16 angustissimi subulati, trabeculati linea longitudinali plus minus evoluta vel obsoleta exarati colorati, interni: cilia totidem capillaria pallidiora externis æquilonga, membrana basilari carentia, parum sulcata et ad carinam linea longitudinali hic illic secedente percursa; calyptra dimidiata." Further (*l. c.* p. 447), in his *Conspectus Fabroniacearum*, the inner peristome of *Schwetschkea* is described as consisting of "cilia 16 capillaria pallida vix sulcata et pertusa, ad basin usque infimam libera."

In this genus *Schwetschkea* Müller described three new species, and also referred to it *Neckea pygmæa* Dozy & Molkenb. Ann. Sci. Nat. iii. sér. ii. 313 (1844). Of the last-named species, and of two other species, viz. *Pterogonium laxum* Wils. Lond. Journ. of Bot. vii. 276 (1848), and *Neckera gracillima* Tayl. *l. c.* 192, Müller observed as follows:—"Wie weit *Neckera pygmæa* Dz. et Mb., welche die Bryol. Javanica (ii. p. 180) gewiss ganz richtig als Fabroniacee erkannte, wenn sie auch das Moos sicher nicht richtig als *Anacamptodon pygmæus* Lac. gelten lässt; wie weit *Neckera laxa* Syn. Musc. (*Pterogonium laxum* Wils.) von der chinesischen Insel Tschusan, und wie weit *Neckera gracillima* Tayl. vom Pichincha bei Quito hierher gehört, weiss ich nicht zu entscheiden. Ich vermuthe nur sehr stark, dass die *N. pygmæa* von Borneo eine *Schwetschkea* sei, weshalb ich sie auch derselben unten einflecten werde." Apparently on the strength of the above remarks, we find Jaeger in his Adumbr. ii. 288 calling the two mosses *S. laxa* Wils. and *? S. gracillima* Tayl. In Paris's *Index Bryologicus* both species are placed under *Schwetschkea*, the query being omitted from the latter species.

Now, the fundamental generic character of *Schwetschkea* is found, according to Müller, in the structure of the inner peristome, which is described by this author as consisting of cilia-like teeth with no trace of a basal membrane. On turning to the figures of *Leskea pygmæa* in Musci Archip. Ind. tab. xlix., however, we find the cilia of the internal peristome represented as springing from a well-developed basal membrane which reaches to a quarter of the length of the teeth of the external peristome. Having had an opportunity of examining the fruit of a moss which I believe to be this species, and of three other species which have been referred to *Schwetschkea*, the following notes on the structure of the peristome may be of interest.

S. pygmæa (Dozy & Molkenb.). I have lately had a fine fruiting specimen of a *Schwetschkea*, which appears to be this species, sent

to me by Dr. Geheeb from Java (Wonosobo, 799 m. alt., ad trunc. arbor. leg. Adolf Seubert, Martio 1879). I have not been able to see an authentic fruiting specimen of *S. pygmæa*, but an authentic barren example from Borneo in the British Museum Herbarium agrees perfectly in vegetative characters with Dr. Geheeb's plant; and, further, the latter agrees so well—except in one particular mentioned below—with the description and figures of the fruiting plant of *S. pygmæa* given in Musci Archip. Ind., that I feel little hesitation in regarding the Javan plant as *S. pygmæa*—a species which has hitherto been known only from Borneo. With regard to the inner peristome of *S. pygmæa*, we find it described in Musci Archip. Ind. p. 175, as follows:—"E ciliis sedecim, dentibus alternis et altitudine æqualibus, linearibus, ex unica cellularum serie compositis, punctatis, basi membrana brevi carinato-plicata epunctulata conjunctis." In the plate xlix. the basal membrane of the inner peristome is represented as reaching to a quarter of the length of the external peristome-teeth. Now in Dr. Geheeb's moss the basal membrane of the inner peristome is so reduced as to be hardly visible (see fig. 12). Whether this is always the case, or whether the basal membrane is sometimes developed to the extent shown in the plate mentioned above, must remain for the present doubtful. It is clear, however, that a slight modification of Müller's description of the inner peristome ("cilia membrana basilari carentia") is required for at least some of the species of the genus.

S. boliviana C. Müll. In the specimen of this species in the Kew Herbarium, labelled "Mapiri, Bolivia, 10,000 ft., May, 1886, leg. H. H. Rusby, M.D., nr. 3182," the cilia of the inner peristome are borne on a very reduced but still evident basal membrane (see fig. 13).

S. laxa (Wils.) Jaeger. A single capsule, somewhat old, of this species, from the type in the Kew Herbarium, which I have examined, showed only a rudimentary peristome, consisting of merely short projections indicating teeth, as shown in Wilson's drawing in Lond. Journ. of Bot. vii. tab. 10 E (1848); no basal membrane could be observed. It is quite possible, however, that the fragmentary nature of the inner peristome was here due to the advanced age of the capsule. The species in habit, vegetative characters, &c., is evidently a *Schwetschkea*, and seems closely allied to *S. pygmæa*.

S. gracillima (Tayl.) Jaeger. This moss certainly does not belong to *Schwetschkea*. The inner peristome consists of slightly keeled processes, usually somewhat perforated along the median line, borne on a well-developed keeled basal membrane (see fig. 14, drawn from the specimen in the Kew Herbarium labelled "Andes Bogotenses, J. Weir, nr. 304"). Further, the vegetative characters and the areolation of the leaves are quite different to what is found in the species of *Schwetschkea*. The species is best left under Mitten's name *Leskea gracillima* (Tayl.). It was probably Taylor's description—"inner peristome of sixteen pale setaceous laciniæ, united at the base by the inner membrane of the capsule" (Lond. Journ. Bot. vii. 192 (1848))—that caused Müller in the first place to suspect that the present species might be a *Schwetschkea*.

Explanation of Plate 443.

Figs. 1–11.—*Bryum* (*Brachymenium*) *columbicum*. 1. Plant, about nat. size. 2. Operculate capsule, nearly mature, × 12. 3. Deoperculate capsule, showing peristome, × 7. 4. Portion of the peristome, showing three external teeth (which become reflexed on the application of potash), and the structure of the inner peristome, × 35. 5. Portion of the inner peristome, showing the tooth-like processes and the intermediate keeled portions of the basal membrane, × 100. 6. Stem-leaf from a fruiting stem, × 18. 7. Stem-leaf from a barren (innovation) stem, × 18. 8. Areolation of a stem-leaf towards the base, × 270. 9. Areolation of a stem-leaf at one-half its length, showing hexagonal cells, × 270. 10. Marginal cells of a stem-leaf at one-third from the apex, showing the border, × 270. 11. Transverse section of the nerve of a stem-leaf, in its lower half, × 170. (Figs. 1, 2, 6–11 are drawn from the type-specimen of *Osculatia columbica* De Not. in De Notaris's herbarium at the R. Istituto ed Orto botanico di Roma; figs. 3–5 from the specimen mentioned of *Bryum globosum* Mitt. in the Kew Herbarium.)

Fig. 12.—*Schwetschkea pygmæa* (from the Javan plant sent by Dr. Geheeb). Portion of inner peristome, seen from the inside, × 270.

Fig. 13.—*S. boliviana* C. Müll., from a specimen in the Kew Herbarium. Portion of inner peristome, seen from the inside, × 170. (*Note*.—The surface-markings on the external peristome-teeth are not shown, for the sake of clearness, in the drawing; also, for the same reason, the walls of the cells of the basal membrane of the inner peristome are shown with thick walls, whereas (as is the case also with those of fig. 12) these cell-walls are very thin and delicate.)

Fig. 14.—*Leskea gracillima*, from an authentic specimen in the Kew Herbarium. Portion of inner peristome, showing the well-developed keeled basal membrane, × 170.

NEW VARIETIES OF BRITISH MOSSES.

By H. N. Dixon, M.A., F.L.S.

Campylopus atrovirens De Not. var. gracilis, var. nov. Habit of the most slender forms of *C. flexuosus*, especially var. *paradoxus*, the shorter forms closely resembling *C. pyriformis*. *Very slender*, 1–2½ in. high, *bright or yellowish green above*, yellowish brown below; sparingly radiculose, densely tufted. Leaves frequently longer than in the type (6–10 mm. including the hair-point), but *much narrower, the subula and hyaline arista exceedingly slender*; cells of the upper half of the lamina *usually rhomboid, thin-walled*.

Early in 1899 Mr. D. A. Jones, of Harlech, sent me a specimen of *Campylopus* collected by him on Moel-yr-Ogof, Carnarvonshire, in April, 1898, having much the appearance of *C. pyriformis*, but with distinct hyaline points to the leaves, for which no satisfactory determination seemed obtainable, although it was submitted to several authorities. *C. atrovirens*, *C. pyriformis*, and a hybrid between the two were among the suggestions made! Later in the same year, Mr. Jones, having made a careful search in other localities for the moss, sent me two or three further gatherings, all identical in appearance with the former plant; but on examination it turned out that some of the gatherings, notably one from Cwm Bychan, consisted of or at least included a curious form of *C. pyriformis* with short but distinct hyaline points to some of the upper leaves; in all these cases the plants had a scorched appearance, were very short, and seemed to have come from a very dry

and exposed situation. It appeared probable that the hyaline point was due to an abnormal, perhaps pathological condition, due to this exposure and scorching. The development of the hair-point in various *Tortulæ*, *Bryum argenteum*, etc., in response to a dry, sunny, exposed situation, is a well-known phenomenon. Last year (1901), however, further light was thrown on the problem during a visit which I paid to North Wales. I ascended Cader Idris on one of those sultry days in July which field-botanists will probably not have forgotten, least of all any who chose one of them to climb a mountain on its south side. Among the very few mosses of interest I collected was a dense tuft of *Campylopus* growing among shaded rocks a few yards below the summit, at the top of the cliffs overhanging Llyn-y-Gader; this on examination proved to be identical in structure with the plant from Moel-yr-Ogof referred to above. The tuft was 2½ to nearly 3 in. in height, and, growing in a constantly shaded spot at an altitude of 2900 ft., was in good condition, and could not be suspected of being scorched (though the weather was hot enough to develop hair-points almost on a *Fontinalis*). A few days later, in company with Mr. Jones, I gathered the same plant growing by a damp and shady roadside near Harlech; and a visit under his guidance to the Cwm Bychan locality resulted in a few stems being found of the short original form, so short indeed as to be almost if not absolutely indistinguishable even with the lens from the abundant and fruiting *C. pyriformis* with which it was intermixed. These discoveries led to a re-examination of the earlier gatherings, and in the result it became quite clear that two plants were involved—one the curious form of *C. pyriformis* referred to above, which by its most unwonted and unwarranted assumption of a hyaline point had gratuitously introduced confusion into the question; and the other the plant now described, which, in spite of its total unlikeness in habit to *C. atrovirens*, must without any doubt be referred to that species. The structure of the nerve and auricles and other points are identical with those of that plant, the chief difference, albeit a marked one enough, being that of size and habit. The colour and the great slenderness are very marked features of the variety, and it is no exaggeration to say that there is no British species of *Campylopus* that bears less resemblance to it in these respects than does the robust, dark-coloured ordinary form of *C. atrovirens*, its own type. The extreme slenderness of the leaf-apex is another very striking character; the thickness of the hyaline arista, and even of the coloured portion of the subula for some distance below this, being frequently as little as 25–30 μ, and not rarely as low as 20 μ; a character best appreciated, perhaps, by remembering that this is no more than the width of a single auricular cell of the leaf-base, or a spore of *Bryum intermedium!* The leaves are by no means short, reaching as much as 10 mm. in length, those of the type being generally given as from 4–6 mm., rarely 8 mm. The upper areolation of the leaf presents an important though not quite constant difference; in typical, well-matured leaves of *C. atrovirens* the thin-walled, rectangular-rhomboid cells of the upper part of the leaf-base gradually pass into narrowly elliptical

cells with an oblique sigmoid curve, usually having the walls considerably thickened; at times this is carried to such an extent that they are properly described as vermicular. In the variety under notice the transition rarely takes place; the upper cells differing little from those of the uppermost part of the expanded base, only showing a tendency to become rounded at the angles and hence rhomboid-elliptical, and at the same time somewhat oblique in their direction. In this, however, there is some variation, as plants occur that must be referred to the variety, but with the areolation almost as in the type. As is frequent in this species, the hair-points are often very short or wanting in many of the leaves.

I sent a specimen of the Welsh plant to Prof. Barker, who recognized it as very closely allied at least to a plant gathered by him some years ago in Skye, and named "var. *pusillus*" by Dr. J. Fergusson. An attempt to trace this varietal name failed until Prof. Barker communicated with Dr. Fergusson, who was kind enough to send the following reply:—"I suppose the name of your moss *Campylopus atrovirens* var. *pusillus* is of my manufacture. I have your specimen in my herbarium marked by you '193 Coruisk 7/81' and by myself *C. atrovirens* var. *pusillus*. Your specimen is evidently from peaty rock or soil. I have a specimen so named gathered by myself at Broadford, from the wall where *Barbula nitida* grew. Perhaps the one moss is different from the other. I cannot now examine them. There is, I see, another variety or form in my herbarium which, like *pusillus*, has never seen the light, and very likely will not. I dare not venture to touch or tamper with mosses now, in case of their casting their old spell over me." This, which was written in 1901, plainly indicates that the varietal name *pusillus* has not been published; I should greatly prefer to have adopted it here, but it would be obviously misleading as applied to a plant which in its well-developed forms is from two to three inches high, and I have thought it better to bestow a name indicative of a more important and more characteristic feature.

There is a specimen of this var. in Wilson's herbarium consisting of three tufts labelled "*Campylopus longipilus* var.; Glen Phee, 1868, Rev. J. Fergusson. No. 2, W. 11/68," upon which Wilson has added the following remarks:—"Curious form approaching *C. setifolius*—differing in sections of leaf, etc. Back of leaf slightly furrowed—texture more cellular than usual." The last remark clearly refers to the form of areolation as described above; the plant is short and very slender, agreeing very closely in these respects with Prof. Barker's specimen, as well as with the smaller forms of the Welsh plant.

C. adustus De Not. is of a different habit, very short, but with wider, shorter leaves, and, according to Limpricht, the stereid cells of the nerve are absent; so that it cannot belong to *C. atrovirens*, to which it has been referred by Husnot and other writers.

The habit, pale colour, and leaf-characters are so marked in the plant here described, and the localities in which it has been gathered so numerous and widespread, that I have felt no hesitation in describing it as a variety; at the same time I am quite aware that transition

forms do occur, starved states of the type also at times taking on a close resemblance to it. The localities from which I have records of the var. *gracilis* are as follows (I have seen specimens of all except the Broadford plant referred to by Fergusson) :—Broadford, Skye (*Fergusson*) ; Glen Phee, 1868 (*Fergusson*, in Herb. Wils.) ; Lake District (probably about High Style), 1870 (*Barker*) ; Loch Coruisk, Skye, 1881 (*Barker*) ; Cader Idris (*Weyman*, 1893 ; *Dixon*, 1901) ; Moel-yr-Ogof, Carnarvonshire, 1898 (*Jones*) ; Cwm Idwal and Clogwyn-du-ar-ben-y-Glyder, 1899 (*Jones*) ; Cwm Bychan, Merioneth, 1899 (*Jones*) ; Roadside near Talsarnau, Merioneth, 1901 (*Jones & Dixon*).

Weisia curvirostris C. M. var. insignis, var. nov. Very *tall and robust*, 3–5 in. high, forming large masses on the face of moist or dripping rocks ; dark or brownish green above, brown or blackish below, stems closely tufted and often radiculose, but rarely matted together and never fragile or encrusted. Leaves *long* (2 mm.), *loosely set*, when dry divergent below, curled and incurved above, when moist *widely spreading from an erect subsheathing base ;* gradually tapering from a *distinctly enlarged base* (·4–·5 mm. wide) to a subacute point ; upper cells rectangular and subquadrate, pellucid. Capsule *narrowly elliptic*, tapering to a distinct neck, dark brown, thick-walled.

I gathered this plant for the first time in 1893, on wet rocks in the gully running down from Meall-nan-Tarmachan, Perthshire, into the little Loch-na-Lairige, but was quite unable to identify it, as was also Dr. Braithwaite, who sent it to Mr. Mitten. The latter wrote as follows :—" The moss you send from Perthshire is, or is supposed to be, a state of the old *Dicranum virens ;* it is so different-looking that I was long puzzled with it, yet now I think it is rightly placed." The leaf is indeed exactly like those found on smaller branches of *Cynodontium virens*, and the general habit more like slender forms of that moss than anything else in our flora, and Mr. Mitten's guarded determination was accepted without any hesitation. Subsequent visits to Scotland, however, began to throw doubt on the matter ; the plant turned up again and again, always maintaining its characters with a high degree of constancy, always barren, always in similar habitats, on the face of wet and dripping calcareous rocks—conditions anything but suggestive of *C. virens*. All attempts to find it in fruit failed, until at last, in company with the Rev. C. H. Binstead, I gathered it fertile in a narrow ravine on Ben Laoigh, and the fruit having the characters of *Hymenostylium* proved it indisputably allied to *Weisia curvirostris*. I have no hesitation in saying that it well deserves the rank of a variety (I have indeed been urged to describe it as a new species)—the only objection that could be lodged against it is the possibility of its belonging to *W. curvirostris* var. *cataractarum* Schp. I have searched the British Museum and Kew collections, and the only plant at all approaching ours is Jack, Lein. & Stitzb. Krypt. Badens Suppl. No. 499, from the Rhein-falls at Schaffhausen, labelled var. *cataractarum* Schp., and cited also under that var. by Limpricht. This comes very near our plant, being only slightly less robust, and also differing in being to some extent encrusted with carbonate of lime, which is never the case with our

plant. On the other hand, Schimper's variety *cataractarum* differs as described in some important characters from our Scotch plant, notably in the capsule, which is ovate or subglobose,* while in ours it is narrow and elongate, as described above; the leaves are also described as softer, chlorophyllose, and (by Boulay) narrow, none of which characters are appropriate to our plant. Moreover, specimens of the var. *cataractarum* issued by Schimper himself in his *Pugillus* (Pissevache, Valesiæ, leg. Schimper) are entirely different in habit, and far nearer *W. curvirostris* type. I am inclined to suspect it may turn out that No. 499, Krypt. Badens, really belongs to the var. now under discussion, and is wrongly placed under the var. *cataractarum*. This presupposes that it has only been found in the sterile condition, which is certainly the case with the British Museum specimen.

The distant, widely-spreading leaves, almost at right angles to the stem, give a characteristic appearance to the var. *insignis* when moist, by which it may be recognized at sight when once known; in neither the moist nor the dry condition does it bear much resemblance to the ordinary forms of *W. curvirostris*. The colour also differs somewhat from that of most forms of *W. curvirostris*, which is usually pale below; in the variety here described the lower part of the stems are brown or blackish, and, as mentioned above, not encrusted.

I have it in my herbarium from the following localities, all collected by myself:—Ben Laoigh, c. fr. and sterile; Meall-nan-Tarmachan; Acharn Falls; Cam Creagh; Lochay Bridge; Tyndrum (all in Perthshire); Glencoe and Ballachulish, Argyleshire; Inchnadamph, Sutherland.

DITRICHUM ZONATUM Limpr. var. SCABRIFOLIUM, var. nov. Leaves, especially in upper part and frequently to base, *scabrous with dense conical papillæ*, frequently on both sides of lamina and at back of nerve.

HAB. Near top of Ben Laoigh, Perthshire side, 31 Aug. 1901 (*Sir Jas. Stirling*); near summit of Ben Lomond (*Mrs. Cunninghame Graham*); near summit of Ben Chalum, Perthshire, 20 July, 1898 (*Binstead & Dixon*). All sterile.

All the authorities whom I have consulted unite in giving *smooth cells* as a character of *Ditrichum* Timm (= *Leptotrichum* Hampe). "Folia omnino lævia" (Schimper); "feuilles lisses" (Boulay); "Blattzellen glatt" (Limpricht) indicate one of the chief characters attributed to the genus, and frequently to the whole tribe of *Leptotrichaceæ;* and I am not aware that any exception has been found to the rule among the fifty species enumerated for the genus *Ditrichum* by C. Müller (*Genera Muscorum*). The roughness of the subula in *D. tenuifolium* Lindb. is due to the nerve and to the projecting ends of the cell-walls, not to any true papillosity of the cells of the lamina. The variety now described is therefore a specially interesting and striking one, and did the plants cited above stand alone, it would have seemed more satisfactory to

* Schimper gives "*Gymnostomum pomiforme* Nees et Hornschuch ex parte" as probably a synonym of his var.

consider them as forming an independent species, and possibly to refer them to a different genus. It fortunately happens, however, that side-lights thrown on the question by some other plants prove that this would have been an error. In the Ben Laoigh plant, which is the best-marked form of those cited above, and to only a very slightly less extent in the Ben Lomond specimen, the conical papillæ formed by the projecting cell-walls on both sides of the leaf are high, very numerous and crowded, and extend from the apex to very near the base over the whole surface of the leaf, which therefore appears highly tuberculated even with a moderately low power. In the Ben Chalum plant the papillæ are less strongly pronounced, and are chiefly visible in the upper part of the leaf; but they are still very conspicuous. Further, a plant sent me by Mr. E. C. Horrell from Wilson's collection (Cwm Llewellyn, near Builth, Brecon, 21 July, 1854, leg. W. Wilson, labelled "Ditrichum") agrees in all respects with the usual forms of *zonatum*, save that the upper cells are frequently slightly papillose; not so markedly nor so constantly so, I think, as to justify its being placed under the present variety, but sufficiently to connect the variety indisputably with the smooth-leaved typical plant. The same is the case with a plant I gathered on Cader Idris in 1901, but in a still less marked degree. Moreover, in *D. flexicaule* var. *densum* I have very occasionally seen the cells distinctly though very minutely papillose, and this is still more definite in a specimen I possess of *D. Drummondii* Ferg., which in my opinion belongs to the same variety. The smoothness of cells attributed to *Ditrichum* must therefore be considered as not absolutely constant, at any rate in the short-celled species.

I have in this description treated *D. zonatum* as a species, chiefly in deference to Limpricht, who has, I think, shown some good grounds for considering it more than a var. of *D. homomallum*. Among these are the usually shorter and less finely subulate leaves, the shorter, often subquadrate cells, and especially the channelled, subtubular leaf-apex, which in *D. homomallum* is concave, but not with the leaf-margins incurved and subtubular as here. The whole width of the lamina also in the upper part of the leaf is usually composed of two or even three layers of cells. The constant sterility of the plant as compared with the almost universal fertility of *D. homomallum* adds further doubt to their being one and the same species; the habit, too, differs greatly in the two plants, while at the same time remaining fairly constant in each.

D. tortile and *D. vaginans* are separable at once from both *D. homomallum* and *D. zonatum* by their recurved leaf-margins.

EURHYNCHIUM MYOSUROIDES Schp. var. BRACHYTHECIOIDES, var. nov. *Robust*, 3–5 in. long, primary stems scarcely stoloniform, secondary stems procumbent, *irregularly, not fasciculately branched, not dendroid*; branches *straight*, rarely very slightly decurved; stem-leaves large, long-pointed, *branch-leaves subsimilar, large*, 1·5–2 mm. long, *with long, fine points*.

HAB. In large masses, on rocks by a stream, Quiraing Hill, Skye, 1893 (*Dixon*); (I have also a specimen from Quiraing, Skye,

collected by Dr. Mason, sent me by Mr. W. E. Nicholson); among rocks, Ben Clibreck, Sutherland, 1899 (*Dixon*); dripping rocks near sea-shore, Lough Swilly, Ireland, Sept. 1902 (*J. Hunter*). Since this description was written I have examined the specimens of *E. myosuroides* in the Kew Herbarium, which I find include several sheets of this variety from the South of Ireland, in the Hookerian Herbarium, under two labels: (*a*) "*E. myosuroides*, large variety, fr. Nr. Connor Hill, Kerry, Ireland. Herb. Hook."; (*b*) "S. of Ireland, W. Mackay. Herb. Dawson Turner" (the sheets containing the var. are those numbered 5, 6, 7, 12, 20 in Herb. Dawson Turner). There seems every probability that the two are from the same locality, and probably from the same gathering. They are identical with my Scotch gatherings, and show the peculiar robust habit of the plant well. Two other plants may also possibly be referable here, one gathered by myself on Ben Laoigh, Perthshire, 1893, the other sent me by Mr. Jas. Murray, collected on Ben Voirlich by McKinlay in 1863, but they are too fragmentary for a decisive identification.

The peculiarity of this plant is its very robust growth and the entire absence of the dendroid habit so characteristic of most forms of *E. myosuroides*. The habit is that of a *Brachythecium*; there is no marked distinction between the primary and the secondary stems, or again between these and the ultimate branches, and the same thing may be said to a great extent of their foliation; it is indeed the large, almost piliferous leaves of the branches that give the plant much of its robust and characteristic appearance. It bears some resemblance to certain of the North American plants which have been variously described as species allied to, or as varieties of *E. myosuroides*, notably *E. stoloniferum* (Brid.) Hook., and *E. spiculiferum* Mitt.;* the former, however, differs, *inter alia*, in the absence of the long points to the leaves, and the latter in its papillose cells. The nerve in the stem-leaves in the var. *brachythecioides* is often very faint or short and double, as in var. *tenuinerve* (Kindb.) Braithw. The few capsules present on the Quiraing plant and in the Irish specimens resemble those of the var. *rivulare* Holt, being short, ovate, of a deep chestnut-brown, and thick-walled.

NEW OR NOTEWORTHY SOUTH AFRICAN PLANTS.

By Spencer Moore, F.L.S.

Three small collections from South Africa have recently been received at the British Museum. One of them was made by Capt. Barrett-Hamilton in the north of the Orange River Colony, near Vredefort Road. Mr. H. T. Ommanney, who sent the second, collected in the neighbourhood of Johannesburg; while from Zululand and the neighbouring south-eastern part of the Transvaal a small number of specimens have been forwarded by Lieut. Pateshall

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* *Isothecium myosuroides* subsp. *hylocomioides* (Kindb.) Paris is unknown to me.—H. N. D.

Thomas. Some of the more interesting plants of these collections, as well as a few new species and varieties, are here passed under notice. The paper includes also a new Asclepiad collected by Mrs. H. Hutton in Natal, and sent in a small parcel by Dr. Selmar Schönland, Curator of the Albany Museum, Grahamstown.

Oldenlandia amatymbica K. Sch. *Capt. Barrett-Hamilton.*
Anthospermum pumilum Sond. *Capt. Barrett-Hamilton.*
Diplopappus asper DC. *H. T. Ommanney*, No. 34.
Helichrysum metalasioides DC. *Capt. Barrett-Hamilton.*
H. miconiæfolium DC. *H. T. Ommanney*, No. 43.
H. oreophilum Klatt. *H. T. Ommanney*, No. 50.
H. allioides Less. *H. T. Ommanney*, No. 66.
H. Dregeanum Harv. & Sond. *Capt. Barrett-Hamilton.*

Geigeria intermedia, sp. nov. Suffrutex parvus caule valido cortice crasso brunneo obducto, ramulis gracilibus erectis penitus crebro foliosis minute fulvido-furfuraceis, foliis alternis angustissime linearibus acutis involutis uninervibus scabriusculis multiglandulosis, capitulis majusculis terminalibus solitariis disciformibus foliis summis involucratis, involucri ovoidei pluriseriati phyllis exterioribus ovatis margine decoloribus sursum puberulis paucis extimis breviter foliaceo-appendiculatis reliquis cuspidulatis, phyllis intimis anguste lineari-lanceolatis acuminatis margine ciliatis, receptaculo setoso, achæniis anguste cylindricis dense albo-villosis, pappi setis circa 12 late vel anguste oblongis exterioribus obtusis interioribus breviter aristato-acuminatis nonnunquam muticis.

Hab. Johannesburg; *H. T. Ommanney*, No. 44.

Planta ex notulis cl. detectoris 10·0–30·0 cm. alt. Ramuli circa 0·1 cm. diam. Folia 2·0–4·0 cm. long., pleraque circa 2·5 cm., 0·06 cm. lat., basi parum decurrentia, in sicco viridia; nervus medianus aliquantulum incrassatus. Involucrum 1·3 cm. long., basi 1·2 cm. sursum modo 0·1 cm. diam. Phylla extima 0·7 cm. long., appendice foliacea 0·3 cm. long. exempta; phylla intermedia circa 1·0 cm. long., summum 0·3 cm. lat.; phylla intima circa 1·2 cm. long. Flosculi basi coartati, in toto 0·65 cm. long.; lobi lineari-lanceolati, rigide acuminati, scabriusculi. Achænia fere 0·2 cm. et pappi setæ 0·15 cm. long., hæ albæ.

Intermediate between *G. Burkei* Harv. and *G. Zeyheri* Harv., having, broadly speaking, the large heads of the former and the latter's narrow and involute leaves. The leaves are, however, considerably shorter than those of *G. Zeyheri*, and, being crowded upon the branches, give the plant quite a different appearance. Further differences from *G. Zeyheri* are the absence of ray-florets, the narrower inner involucral leaves, and the shorter and weaker awns to (sometimes even absent from) the inner scales of the pappus.

Bidens leucantha Willd. *H. T. Ommanney*, No. 20.

Cenia albo-villosa, sp. nov. Verisimiliter annua caule erecto attenuato parum ramoso, ramis foliosis subteretibus piloso-villosis, foliis parvis bipinnatisectis segmentis anguste linearibus obtusis albo-villosis, pedunculis folia magnopere excedentibus deorsum piloso-villosis sursum glabris sub capitulo more generis inflatis,

capitulis mediocribus late campanulatis homogamis flosculis omnibus hermaphroditis involucro æquialtis, involucri 2-serialis phyllis circa 25 oblongis obtusissimis uninervibus anguste albo-marginatis interioribus quam exteriora paullo latioribus, corollis 4-lobis, achæniis immaturis oblongis integerrimis.

Hab. Orange River Colony, near Vredefort Road; *Capt. Barrett-Hamilton.*

Planta usque ad 15·0 cm. alt. Folia nec ultra 1·5 cm. long., sæpissime vero breviora (sc. circa 0·6–1·0 cm.); segmenta 0·1–0·2 cm. long. Pedunculi 8·0–10·0 cm. long., sub capitulo usque 0·3 cm. diam. dilatati. Involucri phylla circa 0·3 cm. long. Achænia 0·1 cm. long.

Nearest *C. microglossa* DC., but different in the clothing of the leaves, the small heads on peduncles not nearly so greatly swollen under the receptacle, the somewhat diverse involucral leaves, and the smaller corollas and achenes.

Cineraria Hamiltoni, sp. nov. Caule erecto ramoso lignoso valido sursum dense foliato albide araneoso-tomentoso cito pubescente, foliis sessilibus maxima pro parte e ramulis lateralibus abbreviatis oriundis pinnatisectis segmentis pinnatifidis necnon horum lobis dentato-lobulatis primo utrinsecus albo-araneoso-tomentosis mox pubescentibus, capitulis turbinatis radiatis in corymbis brevibus terminalibus dispositis, pedunculis propriis araneosis capitula excedentibus vel iis æquilongis sursum bracteis parvis in calyculi phylla brevia subulata transeuntibus dense præditis, involucri phyllis circa 10 inter se inæquilatis oblongis vel oblongo-linearibus obtusis acutisve sursum ciliolatis, flosculis involucrum excedentibus circa 30 quorum 6 ligulis brevibus oblongo-obovatis obscurissime 3-dentatis flavis, disci flosculis omnibus fertilibus, styli ramis truncatis penicillatis, achæniis extimis valde compressis interioribus compressiusculis omnibus pubescentibus.

Hab. Orange River Colony, near Vredefort Road; *Capt. Barrett-Hamilton.*

Planta usque ad 40·0 cm. alt. Caulis inferne 4·0–6·0 cm. diam., ibique multirimosus necnon pallide brunneus, sursum tenuior. Folia 2·5–4·0 cm. long., circa 2·0 cm. lat.; lobi modici 0·5–1·3 cm. long., infimi minores. Pedunculi proprii 0·5–1·0 cm. long.; horum bracteæ circa 0·2 cm. long. Involucra 0·5 cm. long.; phylla 0·08–0·13 cm. lat. Ligulæ 0·4 cm. long., 0·2 cm. lat. Disci corollæ sursum gradatim dilatatæ, in toto 0·5 cm. long. Antheræ inclusæ. Achænia vix matura 0·15 cm. long. Pappi setæ albæ, 0·3–0·5 cm. long.

Nearest *C. aspera* Thunb., from which it differs in tomentum, lobing of leaf, the short peduncles, &c.

Senecio orbicularis Sond. *H. T. Ommanney*, Nos. 8 & 9.

S. bupleuroides DC. *H. T. Ommanney*, No. 10.

S. albanensis DC. *H. T. Ommanney*, Nos. 67 & 70.

Dimorphotheca Barberiæ Harv. *H. T. Ommanney*, No. 33. The large-leaved state exactly as figured in Bot. Mag. t. 5337.

Haplocarpha scaposa Harv. *H. T. Ommanney*, No. 7.

H. scaposa Harv. **var. PINNATIFIDA, var. nov.** *Capt. Barrett-Hamilton.* **This has all the characters of the type, including the**

glabrous achenes with basal tuft of hairs; but the leaves are pinnatifid, with lobes reaching 1 cm. in length, and sometimes 1·5 cm.

Meridiana Krebsiana O. Kuntze, var. *hispidula* Harv. (*Gazania* Less.). *Capt. Barrett-Hamilton.*

Cervicina pinifolia (*Wahlenbergia pinifolia* N. E. Br.) var. BREVIFOLIA, var. nov. Transvaal, Pivaan's Poort, between Utrecht and Luneberg; *Lieut. Pateshall Thomas.* Leaves only 3·0–8·0 cm. long: except for this, it has the characters of the type.

Schizoglossum Huttonæ, sp. nov. Caule elongato filiformi sparsim folioso cito glabro, foliis sessilibus angustissime linearibus quam internodia brevioribus conduplicatis marginibus microscopice denticulatis juvenilibus puberulis, cymis paucis interpetiolaribus umbellatis quam folia brevioribus 8–15-floris, pedunculis filiformibus puberulis pedicellos sat elongatos æquantibus vel quam ii longioribus, bracteis lineari-subulatis quam pedicelli multo brevioribus, floribus parvis, calycis lobis oblongo-lanceolatis acutis extus pilosulis, corollæ usque ad medium partitæ lobis verisimiliter ascendenti-patentibus brevibus ovatis obtusis intus basi barbatis, coronæ squamis usque ad medium gynostegio adnatis rhomboideo-trilobatis intus appendiculatis lobis lateralibus brevibus ovatis obtusis lobo intermedio deltoideo caudato-acuminato supra gynostegium incurvo, polliniis minutis anguste ovoideis sursum vacuis caudiculis perbrevibus cum glandula oblonga conjunctis.

Hab. Howick, Natal; *Mrs. H. Hutton*, No. 407.

Planta saltem 30·0 cm. alt. Caulis circa 0·1 cm. diam., minute striatus. Folia 6·0–7·0 cm. long. (juvenilia vero nondum omnino evoluta breviora), circa 0·05 cm. lat. Pedunculi 2·0–3·0 cm. long., aliquantulum nutantes. Pedicelli 1·0–2·0 cm., bracteæ 0·3–0·4 cm. long. Flores virides, 0·5 cm. diam. Calycis lobi 0·3 cm. long. Corollæ lobi 0·22 cm. long. et lat. Coronæ squamæ vix 0·2 cm. long., summum totidem lat. Pollinia 0·035 cm. long. Stigma apice levissime excavatum.

Easily distinguished by the slender habit, the few and long leaves, slender nodding peduncles, long pedicels, and rhomboid corona-scales exceeding the gynostege and inappendiculate within.

Schizoglossum crassipes, sp. nov. Humilis, caule crassiusculo glabro e basi incrassata valida erecto deorsum simplici sursum ramulos plures attenuatos foliaceos pubescentes mox puberulos emittente, foliis parvis brevipetiolatis anguste lineari-lanceolatis hastulatisve acutis marginibus aliquatenus revolutis cito puberulis, cymis interpetiolaribus quam folia longioribus umbelliformibus 4-floris, pedunculis pedicellis subæquilongis, bracteis subulatis deciduis una cum pedunculis pedicellisque pubescentibus, calycis lobis lanceolato-oblongis acutis pubescentibus, corollæ fere usque ad basin partitæ lobis ascendentibus anguste ovato-oblongis obtusis calycem bene excedentibus, coronæ squamis e basi angusta deorsum gynostegio adnata oblongis obtusissimis intus inappendiculatis gynostegium paullulum excedentibus, polliniis pyriformibus prope caudiculæ quam ea ipsa brevioris insertionem attenuatis, glandula anguste oblonga.

Hab. Orange River Colony, near Vredefort Road; *Capt. Barrett-Hamilton.*

Planta modo 10·0 cm. alt. Caulis basi 1·0 cm. diam., subito usque ad 0·4 cm. coartata. Rami foliigeri 5·0 cm. long., filiformes, angulati. Folia 0·5–0·7 cm. long., nec ultra 0·2 cm. lat.; petioli circa 0·1 cm. long. Pedunculi 0·3–0·8 cm., pedicelli 0·3–0·7 cm., bracteæ 0·2 cm. long. Flores olivacei, 0·6 cm. diam. Calycis lobi 0·26 cm., corollæ lobi 0·4 cm. long. Coronæ squamæ 0·2 cm. long., 0·12 cm. lat. Pollinia 0·07 cm., caudiculæ 0·03 cm. long.

Easily distinguished by its habit, tiny leaves, small cymes, and linguiform corona-scales inappendiculate within and somewhat exceeding the gynostege.

Brachystelma prælongum, sp. nov. Humilis caule deorsum crasso sursum attenuato et mox ramoso, ramis gracilibus compressiusculis una cum foliis et pedunculis pubescentibus, foliis sessilibus filiformibus apice acutis, floribus parvis, pedunculis interpetiolaribus solitariis ascendentibus quam folia multo longioribus, calycis pubescentis lobis lanceolatis acuminatis erectis, corollæ campanulato-rotatæ ultra medium 5-lobæ tubo extus puberulo lobis linearilanceolatis obtusis maxime reflexis, coronæ squamis in tubum sat alte connatis quâque apice breviter 3-loba lobo intermedio lanceolato quam laterales oblongos longiore, polliniis subsphæroideis, caudiculis brevissimis glandulæ subrhomboidali affixis.

Hab. Orange River Colony, near Vredefort Road; *Capt. Barrett-Hamilton.*

Planta modo 8·0 cm. alt. Caulis pars crassa 3·0 cm. alt., pars tenuior 0·3 cm. Ramuli ascendentes, 0·05–0·1 cm. diam. Folia 0·5–0·7 cm. long., circa 0·1–0·2 cm. lat. Pedunculi 2·0–4·5 cm. long. Flores modo 0·5 cm. diam. Calycis lobi vix 0·3 cm. long. Corollæ pars indivisa verisimiliter lutea, circa 0·25 cm. long.; lobi circa 0·5 cm. long., in sicco olivacei, utrinque pilosi. Coronæ squamarum lobi laterales 0·03 cm., lobus intermedius circa 0·1 cm. long. Pollinia 0·025 cm. diam.

A remarkable species, easily known by its slender habit, small leaves, and tiny flowers on very long peduncles.

Parasia grandis Hiern (*Belmontia grandis* E. Mey.), var. MAJOR, var. nov. Remarkable on account of the size of the flowers. Calyx 2·5 cm. long. Corolla about 3·0 cm. diam. The leaves are decidedly larger than usually obtains (4·0 cm. long, and 0·8 cm. broad near the middle). — Transvaal, Pivaan's Poort; *Lieut. Pateshall Thomas.*

Sebæa linearifolia Schinz. *Capt. Barrett-Hamilton.*

Cynoglossum enerve Turcz. *H. T. Ommanney*, No. 86.

Chætacanthus costatus Nees. *H. T. Ommanney*, No. 16.

Chætacanthus hispidus, sp. nov. Herba parvula, sparsim ramosa, deorsum efoliata, foliis abbreviatis sessilibus obovato-oblongis obtusissimis basin versus cuneatim angustatis mox breviter ciliatis, spicis brevibus paucifloris, bracteis anguste obovato-oblongis obtusis vel obtuse acutis pauci-glandulosis extus pilis hispidis obsitis intus fere vel omnino glabris, bracteolis lineari-setaceis hispide ciliatis bracteas semiæquantibus, calycis bracteas excedentis lobis ad normam generis nisi pilis patentibus hispidis onustis, corollæ tubo calycem excedente superne pubescente, staminum posticorum filamentis evanidis, ovario oblongo, stylo puberulo.

Hab. Orange River Colony, near Vredefort Road; *Capt. Barrett-Hamilton.*

Planta 3·0–4·0 cm. alt., rhizomate duro aliquantulum nodoso sparsim fibrillifero fulta. Rami graciles, glabrati. Folia 0·5 cm. long., 0·25 cm. lat., firma, copiose cystolithigera. Bracteæ 0·6–0·7 cm. et bracteolæ 0·35 cm. long. Calyx 0·8 cm. long., ejus lobi 0·5 cm. long. Corolla in toto 1·3 cm. long. Antheræ basi brevissime calcaratæ. Ovarium 0·2 cm. et stylus 0·9 cm. long. Capsula anguste oblongo-ovoidea, 0·4 cm. long. Semina 0·1 cm. diam.

The chief points about this are the lowly habit, the small leaves, and the hispid bracts, bracteoles, and calyx.

Blepharis dilatata C. B. Clarke. *Capt. Barrett-Hamilton.*

Barleria macrostegia Nees. *Capt. Barrett-Hamilton.*

Isoglossa Ecklouiana. Transvaal, Pivaan's Poort; *Lieut. Pateshall Thomas.*

Diapedium Clinopodium O. Kuntze (*Dicliptera Clinopodia* Nees), var. MINOR, var. nov. Normal, except for the small bracts: only 1·0 cm. long.—Zululand, Isandhlwana; *Lieut. Pateshall Thomas.*

Lippia scaberrima Sond. *Capt. Barrett-Hamilton.* Fine specimens of this rare plant.

Orthosiphon Pretoriæ Gürke. *H. T. Ommanney*, No. 13.

HYBRIDITY IN *HIERACIUM*.

By Frederic N. Williams, F.L.S.

In a note in the last number of this Journal (p. 362) there is a disposition, it seems, to beg the question all along the line. In the first place, it is doubtful whether "it is highly desirable" in this utilitarian age "that some acute and careful botanist should make a lifelong study of this most difficult genus." We have already had several object-lessons in the effects of such concentration of effort on critical genera, and their results are not encouraging. What we invariably see, in such an extremely limited sphere of work, is over-discrimination of trivial differences, a tendency to describe an excessive number of individuals, ineptitude in grasping the significance of salient characters, and obscuring of the capacity to pick out the connecting strands of affinity among groups of species; in fact, inability to see the wood for the trees.

The genus *Hieracium* includes such an extraordinary number of distinct forms, that no other genus of flowering plants can compare with it. Some of these forms, indeed, are distinguished by special peculiarities, and may be taken as type-forms of species, while all the rest represent intermediate and transitional forms by which the type-forms are connected together. On the protean character of the constituent members of this genus much has been written, and many controversies have arisen, without as yet coming to a definite conclusion generally acceptable to all parties. French, German, and Swiss botanists have introduced the factor of the natural

tendency to form hybrids, associated with the inherent instability of definite characters, especially such characters as are separately or collectively sensitive to ecological influences, and susceptible to the conditions of the environment. If the physiographical map of Scotland be compared with that of those parts of Europe where hawkweeds "most do congregate," the ecological conditions will not be found to be remarkably different, but essentially similar. It is an axiom of the principles of variation, that like conditions do not produce unlike phenomena; and that, given the similar conditions in places even far apart, it is not isolated types of endemic species that are so likely to occur, as slightly varying or even transient products of subsimilar units.

The statement in the note referred to, that hybrids "are decidedly rare *in this country*," does not necessarily imply that they do not frequently occur, but rather that their hybrid-character is not detected. The question of the origin of the numerous and (to some extent) constant intermediate forms acquired no small interest when Uechtritz, and afterwards Naegeli, in the spirit of the Darwinian teaching, defended the view that these forms are to be regarded as arising from the transmutation of lost or still existing species, favoured by the incoherence of associated characters; reducing fixity of type to a *minimum*. Schultes and Mendel raised several *Hieracium*-hybrids artificially. Again, Focke, whose critical judgment no systematist will dispute, shows that the crossing of *H. Pilosella* and *H. præaltum* proved the origin of no fewer than eleven so-called "species"—plants which at least received specific names! Bentham also says that in this country specimens are frequently found apparently intermediate between the commonest species.

Whether one prefers to accept the immediate or remote hybrid-origin of many forms (or neither), the evidence furnished by Mendel and by more recent investigators seems to point to a theory of heredity of the type of Darwin's Pangenesis, in the form lately put forward by Prof. Hugo de Vries, of Amsterdam.

THOMAS COMBER.

(1837–1902.)

Thomas Comber, of Neston, Cheshire, who died suddenly at Blackpool on Jan. 24, and whose magnificent collection of *Diatomaceæ* has been presented by his widow to the National Herbarium, was born at Pernambuco on the 14th of November, 1837. He was educated in Liverpool, and then went into his father's business as an East India merchant. In 1858 he went out to Bombay, where he remained until 1863, when he joined the firm of Lyon & Co. (Bombay, Manchester, and Liverpool), being himself in charge of the last-named branch until his retirement in 1899.

He early began the study of diatoms, to which in later life his leisure was mainly devoted; and in 1858, when he was just twenty-

one, read before the Historic Society of Lancashire and Cheshire a paper "On the *Diatomaceæ* of the Neighbourhood of Liverpool," which was published in the Transactions of the Society in the year following. The list enumerates 266 species and varieties, and thus represents a large amount of work at a group then but little studied. On his return to England Comber took up the study of the distribution of British phanerogams. A short note on Manchester plants appeared in this Journal for 1872, p. 376, in which subsequently

(1874) were printed abstracts of his excellent papers on the world-distribution and dispersion of British plants, published in the Historic Society's Transactions in 1873–4; his essay on the "Geographical Statistics of the Extra-British European Flora" was reprinted (from the same Transactions) in this Journal for 1877. A paper on the migration of plants was read to and pub- by the Literary and Philosophical Society of Warrington in 1875.

After this the literary side of botany attracted Comber's notice; three papers on "The Etymology of Plant Names" were read before the Historic Society in 1876–8, and published in their

Transactions. Photo-micrography later occupied his attention and formed the subject of two papers published in the Journal of the Royal Microscopical Society in 1890 and in the Journal of the Liverpool Microscopical Society in 1891, and he subsequently contributed short papers on *Diatomaceæ* to the first-named Journal. His most recent work was the list of diatoms of the Clyde Area compiled for the volume on the fauna and flora of that region issued in 1901; and the enumeration of *Diatomaceæ* in the *Catalogue of Welwitsch's Plants*, published in the same year by the British Museum.

Comber's publications, however, give but a poor notion of his work; this can best be estimated by consultation of his collections, on which no expense was spared. Some idea of the extent of these may be formed from the statement that they include 2926 microscopic slides of diatoms, 2225 photographs, over 500 prints, and 52 cases of descriptions in MS. It may be hoped that some of the material thus collected will be made available by publication; meanwhile they form a valuable addition to the National Herbarium, already rich in this group of plants. Comber's collection of phanerogams was presented by him shortly before his death to the Victoria University of Liverpool.

NOTES ON THE BANKSIAN HERBARIUM.

[The following is a transcript of a folio sheet of memoranda (in Robert Brown's hand), which is among the archives of the National Herbarium. The information it contains may be worth placing on record. A few notes are added in square brackets.—Ed. Journ. Bot.]

Memoranda respecting the Banksian Herbarium and Library copied from notes in Sir Joseph Banks's writing, in a folio book which he began in the year 1777.

Soc. Unit. Frat. (Societas Unitatis Fratrum) [= Moravians].

In the year 1774 I agreed with some of the brethren of this Society who resided at Tranquebar, to send me home dried specimens of such plants as they could procure at the rate of sixpence for a specimen of any species in flower and as much for a specimen in seed, myself to send out paper for drying at my own expence, but to pay no more than two sixpences for any species, nor more than one unless it was sent in both the above mention'd states. In the year 1775 I received from them about 265 species, for which I paid Mr. (Hurlock) apothecary in St. Paul's Churchyard according to the aforesaid rate.

[A second collection, of about similar extent, was received by Banks in April, 1778.]

Herb. Helvet. (Herbarium Helveticum).

In the year 1775, Dr. Pitcairn was by a correspondent in Switzerland offered the purchase of a large herbarium, the collector of which

was dead, and the whole to be sold for the benefit of the widow. As the Dr. made no collection of dried plants he proposed it to me. I readily agreed, and a letter was returned desiring that if the price asked for it was reasonable it might be purchased and forwarded directly to me. It accordingly arrived consisting of 29 large pasteboard covers filled with plants loose on sheets of paper ; the purchase money, charges of carriage, duty etc. of which amounted to £39. As yet however I have not been able to have the name of the person who collected it.

[To this Brown adds: "So far Sir Joseph: in Dryander's hand in pencil follows, 'It was Dick.'"]

Hort. Gordon.

James Gordon, an old, experienced nurseryman, inventor of many improvements in the art of cultivation. His nursery grounds lie on the right hand of the road from Mile-end to Bow soon after you enter the parish of Bromley. In the year 1776 being then very old, he gave up business to his sons and a Mr. [Dermer ?] who immediately added large stoves to the gardens. [He died 1789. Biogr. Index Brit. Botanists, 70.]

Johannes de Loureyro.

John de Loureyro, a Portuguese by birth, and a Jesuit, resided many years at the capital of Cochin-China in a religious mission. He sent [in] 1774 to his friend Capt. Riddel in the East India Company's service a small collection of plants dried, with descriptions of them in Latin, which prove him to be a man of education and abilities: both the plants and descriptions are in my possession through Capt. Riddel's kindness.

[On the title-page of his *Flora Cochinchinensis* Loureiro does not describe himself as a Jesuit, but as "olim in Cochinchinâ Catholicæ Fidei Præconis." He was, however, a Jesuit until the suppression of the Society in 1773.]

Hort. Dni. Pitcairn.

[William] Pitcairn M.D., in the year [1775] President of the College of Physicians, established in the year a botanical garden at Islington, from whence by his favour I have from time to time received many valuable specimens. [Biogr. Index, 136 ; Rees Cyclop., under *Pitcairnia*.]

J. R. & G. Forster.

John Reynhold Forster and George his son embarked in the year 1772 on board the Resolution, Capt. Cook, bound to the South Seas on discovery, sent by the Board of Admiralty; the father as naturalist and the son as his assistant, in my room, when I was disappointed of my anxious desire of undertaking that voyage by the machinations of Sir Hugh Palliser, then Comptroller of the Navy. For their reward they had 4,000 pounds which at my desire was voted by the House of Commons to enable Dr. James Lind of Edinburgh, M.D. to accompany them, but the vote having passed in vague terms, it was thought proper to apply it to the benefit of the voyage of discovery in that manner. On their return they did

me the favour to present me with very many specimens both of plants and animals which they had collected in the different countries they had visited. In the year 1776 I purchased of them for 400 pounds all the drawings of animals and plants which they had made in the course of the voyage.

[The above note has already been printed in this Journal (1885, 363) in the course of a full account of the Forster collections, but it is reprinted here so that Brown's memorandum may appear in its complete form. A large number of Forster's New Zealand plants with manuscript descriptions are in the Paris Museum (see *Voyage de l'Astrolabe* (Botanique), introd. pp. iv, v). A herbarium of J. R. Forster was purchased at his death by Sprengel for 130 louis d'or (Schrader's *Journal für die Botanik*, ii. 195). Another collection, belonging either to J. R. or George Forster, was offered by Dr. Thomas Forster, son of one of them, to the National Herbarium in 1852, but was not purchased, as it was not thought likely to contain anything additional to the very fine series possessed by Banks.]

Copied March, 1828, having obtained leave the same day to do so from Sir Edward Knatchbull to whom I delivered it along with the portrait of Capt. Cook, Sir J. Banks' diplomas, and several other things of smaller importance.

R. Brown.

SHORT NOTES.

Stellaria umbrosa Opiz in Staffordshire. — I found this *Stellaria* growing abundantly in several places about Armitage last June, on the banks of ditches and in hedgerows. The plant is, like *S. neglecta*, more showy than *S. media* from its larger flowers, and altogether more robust and erect habit; but is especially distinguished by its hairless sepals, tuberculate at the base when fresh, and when dry minutely scabrous throughout. My friend Mr. J. E. Bagnall, who has seen the plant, writes to me that he finds it in several Warwickshire localities, but has searched for it in vain in Staffordshire, for which county it is a new record.—H. P. Reader.

The Deadnettles.—Mr. Dunn has followed the right line in his able and well-considered paper (pp. 356–360), adopting geographical distribution as the primary test. He practically proves that *Lamium album* is only a denizen in Britain, and shows good cause for regarding *L. amplexicaule* and *L. intermedium* as colonists; though his suggestion as to the genesis of the former is more ingenious than convincing. The case of *L. purpureum* presents greater difficulty; there is fairly strong evidence in favour of its being aboriginal. But it is, surely, a mistake to say that this species and *L. incisum* "stand on exactly the same footing in our flora." They indeed occur together not unfrequently in cultivated or waste ground; *L. incisum*, however, is also a characteristic inhabitant of sandy heath-borders and rough banks in light soil. I have little doubt that in such situations it is native, and has

spread thence into fields, &c.; just like *Scleranthus annuus*, the indubitably wild form of which (*S. biennis* Reuter) becomes modified into the more slender, straggling state hitherto regarded as the type. *Euphorbia exigua*, placed by Watson as a colonist, would be so ranked by most observers; but Mr. Cosmo Melvill has this year sent to the Botanical Exchange Club a compact form (parallel to *S. biennis*) found growing in limestone crevices—not in arable land—between Rhôs-on-Sea and the Little Orme's Head, North Wales; and I have myself observed it in stations where it looked like a native. Such instances favour the contention that certain species, usually or often colonists, should still be retained among our indigenous plants.—Edward S. Marshall.

Euphrasia gracilis in Kent. — I found this, in September, in small quantity in the woods about half a mile south of Offham, near Malling, in district 8 of the *Flora of Kent*. Mr. Townsend, to whom I am indebted for the name, says he has not hitherto seen specimens from the county; only one locality is cited for it in the *Flora*.—James Britten.

Cumberland Plants.—I spent a week end at Keswick in August for the purpose of searching for *Orchis cruenta*, but was unsuccessful; but we were late in the season, and were met with a deluge of rain in Borrowdale. I found, however, in my walk *Rubus Scheutzii* and *R. silvaticus*, new to the county, also *R. pulcherrimus* and *R. Selmeri*, *Orchis ericetorum*, *Sedum album* on the roadside near Grange; *Sisymbrium officinale* var. *leiocarpum*, Keswick, not given in the Flora. A curious water buttercup allied to *R. truncatus* occurred in Derwentwater, with *Potamogeton alpinus* and *P. pusillus*, the latter not recorded for that lake in Mr. Hodgson's *Flora of Cumberland*. *Arenaria leptoclados*, near Keswick, new to Dist. 1. *Spergula sativa*, Keswick, omitted from the Flora. *Papaver Argemone*, near Penrith. *Alchemilla vulgaris* var. *alpestris*, Borrowdale, not in the Flora. *Carex disticha*, several places about Derwentwater. *C. elata* All. (*C. stricta* Good., non Lam.); in the Flora this is "believed to have been seen at Derwentwater by Mr. W. Mathews"; I saw scores of it in immense tussocks in a marsh near the lower end of Derwentwater. *Arrhenatherum avenaceum*, the type seen about Derwentwater, and also a sylvan form with fewer and more distant spikelets. *Melampyrum pratense* var. *hians*, abundant near Keswick. *Festuca rubra* and the var. *barbata*, near Keswick; the type new to Dist. 1 of the Flora, and the variety not mentioned. *Epilobium montanum*, a curious form of this species grew on slate *débris* in Borrowdale, the inflorescence being much branched, with small flowers. Mr. T. R. Hayes showed me specimens of *Cystopteris montana*, brought many years ago from Skiddaw, not previously recorded for Cumberland, but found by Mr. Bolton King on the Westmoreland side of Helvellyn. *Juncus filiformis* is still plentiful on the shores of Derwentwater, growing in the damp gravelly margin, especially where a slight growth of moss covers the surface of the soil. — G. Claridge Druce.

Zephyranthes flava Baker.—Mr. Baker's account (*Amaryllid.* 37) runs:—"Z. flava Baker. *Pyrolirion flavum* Herb. *P. aureum fauce*

lævi Lindl. in Bot. Reg. t. 1724. — Differs from *Z. aurea* by being destitute of scales at the throat of the tube. Hab. Peru. Known only from the plant described and figured by Lindley." A reference to the Bot. Reg. shows that Lindley's name is simply *P. aureum*, as he believed his figure to be identical with Herbert's plant so called; while the character afforded by the absence of scales seems to originate in a misunderstanding of Lindley's comparison of his plant with Ruiz & Pavon's figure, or, as they are described by Mr. Baker as "minute" in *aureum*, they may have been overlooked. Herbert (Appendix, 37, and Amaryllid. 184) refers to a specimen of *P. flavum* from Ruiz in Lambert's Herbarium. The Ruiz and Pavon herbarium, which formed part of Lambert's collection, is now in the British Museum, for which it was acquired at Lambert's sale at the cost of £270. A careful inspection of the labels attached to Ruiz and Pavon's specimens, in which I have had Dr. Rendle's help, leads to the conclusion that these authors did not regard *flavum* as a species distinct from *aureum* (they publish descriptions only of *aureum* and *flammeum*), nor can we see that the plants differ. Herbert's characters for the three species—*flammeum*, *aureum*, and *flavum*—are not mutually exclusive; and we suspect Lindley was right in supposing that the three formed one species. Herbert says: "There is a specimen with the scape shorter than the flower, which is decidedly *flavum*"; the "short scape" in the only specimen which is so distinguished is due, we think, to its having been broken; moreover, it is labelled *flammeum* by Ruiz & Pavon, and the flower agrees exactly with that of the specimen from Lima (Dombey) in Herb. Banks., which Herbert accepts as the type of that species.—James Britten.

Alchemilla vulgaris L. var. filicaulis (Buser) in West Lancashire (p. 347).—When recording the varieties *pratensis* and *alpestris* of *Alchemilla vulgaris*, we stated that we had no certain record of var. *filicaulis*. This latter variety we have since found near Abbeystead, Wyresdale.—J. A. Wheldon & Albert Wilson.

Worcestershire Plants. — When botanizing with Mr. W. J. Rendall on one of the commons east of the Malvern Hills on June 12th, we met with a mint which we then failed to recognize, but later gatherings showed it to be *Mentha alopecuroides* Hull. A considerable number of flowering stems were thrown up, but they probably all belonged to one plant. Although not near any dwelling, I fear that it is only a garden outcast, as it is difficult to suppose that so conspicuous a plant could for long have escaped notice at this spot, and a plant of a garden *Aster* occurring in a ditch not far distant gives colour to the suspicion. In this Journal for 1895, p. 217, I mentioned that one plant of *Euphorbia Esula* was met with by the late Capt. A. Steuart and myself in a cornfield at Bransford in 1892. No further examples have been found until July 28th this year, when eight or ten plants were seen by Messrs. S. H. Bickham, C. Waterfall, and myself in an arable field about half a mile distant from that in which it occurred in 1892. I am able to add three hybrid Epilobia to those already recorded for this county. These are *E. adnatum* × *Lamyi*, *E. adnatum* × *parviflorum*, and

E. adnatum × *montanum*; all from a small wood at Bransford.—R. F. Towndrow.

Goodyera repens in Norfolk (p. 325). — This plant has been known to grow in Norfolk since 1885, where it was found at Westwick (v.-c. 27) by Miss Southwell on July 8th, as recorded by the late Mr. Geldart in Trans. Norf. & Norw. Nat. Soc. iv. 255. In 1891 Miss A. M. Barnard found it in abundance in the neighbourhood of Holt; Mr. Geldart, when recording this (*op. cit.* p. 329, 1891–2), remarks: "This locality is about twelve miles, as the crow flies, from Westwick, where the plant was first found in 1885 (where it has been since exterminated). It can hardly be regarded as truly wild in either locality. The Scotch firs, amongst which it grows, were probably brought from Scotland, and the plant with them." I agree with Mr. Geldart that there is doubt of its being indigenous to Norfolk. South of Scotland it has occurred in Cumberland (F. A. Lees, Record Club Rep. for 1879, p. 72 (1880)); and in Yorkshire (J. J. Marshall in Journ. Bot. 1888, 379). — Arthur Bennett.

NOTICES OF BOOKS.

Two New Local Floras.

The Flora of the East Riding of Yorkshire, including a physiographical sketch. By Jas. Fraser Robinson: to which is added a List of the Mosses of the Riding, by J. J. Marshall. London: Brown & Sons. 8vo, pp. 253. Price 7s. 6d.

The Flora of the Liverpool District, illustrated by drawings and photographs. Edited by C. Theodore Green, M.R.C.S., etc. Liverpool: Marples. 8vo, cl., pp. 207. Price 5s.

The satisfaction which is felt at the gradual completion of the local floras of England is tempered with a feeling of regret that something like a uniform plan of compilation has not been possible. Had such been the case, the various floras would fit into their places like the pieces of a dissected puzzle, and we should some day be able to form an absolutely correct notion of plant-distribution in this country. It should not have been impossible to find among the numerous volumes which have appeared one which might be taken as a model to which subsequent writers should conform; the *Flora of Middlesex*, for example, might be taken as a type. The more complete floras which have appeared since the publication of that excellent work in 1869 have indeed been largely influenced by its example; but some of these have erred by excess in the introduction of impertinent matter, while others have failed by defect; the natural result being that anything like a satisfactory comparison of the flora of one county with that of another is practically impossible.

We need not indeed go beyond a county boundary to find this discrepancy in an aggravated form; no greater contrast could be found than that between Mr. F. A. Lees's *Flora of West Yorkshire*—one of our best examples—and the *Flora of the East Riding* which

has just been published. Mr. Robinson and those who have worked with them have doubtless done their best, and their efforts deserve encouragement; but it would be idle to pretend that their volume gives anything like an adequate account of East Yorkshire plants.

The Riding is divided into seven districts, each indicated by a number, the citation of which is in many cases all the information supplied as to the occurrence of a plant. A few localities follow, the district for which is never indicated, thus necessitating constant consultation of the map. These localities seem selected on no principle—*e. g.* those for *Parnassia* occupy six lines, an unusual extent, although we are told that the plant is "common in marshy places over all the divisions." The "dock aliens" of Hull obtain a prominence out of all proportion to their importance, and there is a remarkable absence of critical species. The bibliography does not appear to have been exhausted—we find no references to any periodical publications except to Teesdale's papers in the Linnean Transactions.

In his preface Mr. Robinson acknowledges help from various botanists, and it is to be regretted that he did not take advice as to the literary form of his book. It is, for example, unusual to separate by a period the authority from the name, especially when the former is only divided by a comma from the comital distribution: thus, "Geranium molle . Linn., 112." "*Henry* C. Watson" and "*Robert* Spruce" may be regarded as slips; but the repetition of the title of the book at the head of each page might conveniently have given place to the name of the order under treatment. Some interesting local names are given—*e. g.* "Michaelmas Bramble" for *Rubus rusticanus*; it is unusual to find an English name for a critical bramble.

We have no wish to speak discouragingly of this endeavour, but we think Mr. Robinson would have done better to publish his flora in the transactions of some local society. In its present shape it challenges comparison with more adequate works, and such comparison must be to its disadvantage. The introductory chapters on physiography and distribution are well done; the typography is good, although the local printer has not been able to resist the temptation to introduce "ornamental headings."

The new *Flora of the Liverpool District* is in many ways an attractive book. It is well bound, well printed, copiously illustrated —about 800 plants are figured—has an excellent map, and is remarkably cheap; moreover, it represents a large amount of work, and is manifestly carefully done. Yet of this, as of Mr. Robinson's book, it must be said that it falls short in many ways of the standard which we expect a recent local flora to attain.

The special feature of the volume is the illustrations. Most of these are well drawn; they cannot fail to be useful to the amateur, and might easily have been of value to the botanist; but unfortunately in no single case is any detail figured! This is an instance of the amateurish character which pervades the book, and might easily have been obviated had some expert been consulted: such a one would at once have pointed out the comparative

uselessness of figures, especially of critical plants, from which the distinguishing characters are omitted. In one case, at least, the naming is incorrect—fig. 86 is apparently *Arenaria serpyllifolia*; it certainly does not represent "*Cerastium semidecandrum*"; nor can the figure of *Statice rariflora* be accepted for that species. As every species is not figured, it is a pity that the selection has not been better done; no one wants a picture of *Bellis perennis*, but good representations of *Viola canina* and *V. sylvatica* would have been useful; only one of these, however, is given, and that, although labelled "*V. canina*," is, we think, rather to be referred to *sylvatica*. The figures of *Stellaria aquatica* and *S. nemorum* are to our eyes absolutely indistinguishable. Some indication of scale would have been useful to the amateur, who might suppose from the figures that *Sempervivum* and *Drosera* were equal in height.

The introduction is disappointing. There is no bibliography, nor does the text suggest that the literature of the subject has been consulted; Lord de Tabley's *Flora of Cheshire*, to which we should have expected to find reference throughout, does not seem to be mentioned! We look in vain for any account of previous workers, whether dead or living—not even their names are mentioned, save in so far as they have helped in the present work—in some cases indirectly, as we find among the "contributors to the Flora" the name of the Rev. W. W. Newbould. Mr. J. J. Fitzpatrick gives an account of the geology, and there are some excellent photographs of the scenery of the region; but there is no description of the natural features of the district, although the sandhills and their natural gardens, the beauty of which can hardly be imagined by those who have not seen them, offer a tempting subject for description.

In the body of the book, natives, extinctions, and casuals are printed in the same type; some of the latter are figured, which is useful. The authorities for the names are enclosed in brackets, which is not only unnecessary but misleading, although for this Dr. Green can claim the authority of the present editor of the *Flora Capensis*. The useless "English names" which disfigure so many of our books are here in full force—"Baudot's Water Crowfoot," for example, and "Lenormand's Mud Crowfoot." The nomenclature followed is that of the eighth edition of the *London Catalogue*. To some of the families the name of an "authority" is appended; the meaning of this is not quite clear, but it can hardly have reference to the work of the Flora. There is a marked absence of critical forms, which suggests that these have not been studied; such absence, however, is to be preferred to the inclusion on insufficient evidence of names of forms and varieties which encumber our lists and add nothing to our knowledge.

On reading over what has been written, we feel that our criticisms may be considered unduly severe. This, however, is far from our intention; but a review, if it is to be worth anything, must give an account of books as they appear to the reviewer. Mr. Robinson and Dr. Green have both done useful work in bringing together material which will be of service to future investigators; British botanists will find much information in their volumes, and will

do well to place them on their shelves. But a Flora of the East Riding and a Flora of Liverpool, worthy to take their place beside those of Middlesex or of Plymouth, have yet to be written.

Missouri Botanical Garden. Thirteenth Annual Report. By Wm. Trelease, Director of the Garden. 8vo, pp. 133, with 106 plates. Published by the Board of Trustees, St. Louis, Mo. 1902.

Except for the few pages devoted to the Annual Report of the Officers of the Board and that of the Director, the present volume is occupied exclusively with a systematic revision of the *Yucceæ* by the Director, Mr. Trelease. Mr. J. G. Baker, in his "Synopsis of *Aloineæ* and *Yuccoideæ*" (Journ. Linn. Soc. xviii. (1880) p. 148), recognized a close association between the Old World *Aloe* and a few allied African genera, on the one hand, and the New World genera *Yucca*, *Hesperaloe*, *Herreria*, *Beaucarnea*, and *Dasylirion*, comprising the *Yuccoideæ*, on the other. The distinguishing features are the thick fleshy leaves and gamophylly of the *Aloineæ*, and the less succulent, more fibrous leaves and free petals of the *Yuccoideæ*. In the *Genera Plantarum* (1883), Bentham and Hooker, the groups are again closely associated, but the exclusively New World *Yuccoideæ* becomes the larger tribe *Dracæneæ* by the inclusion of *Dracæna* and allied Old World genera. The distinct petals supply the chief diagnostic character of the larger group.

Prof. Engler, in the *Pflanzenfamilien* (ii, 5, 1888), has adopted a different arrangement, placing the *Aloineæ* at some distance from *Dracænoideæ*, which he subdivides into *Yucceæ*, including *Yucca*, and the monotypic Texas genus *Hesperaloe*; *Nolineæ*, also New World, with *Nolina* and *Dasylirion*; and *Dracæneæ*, a small group of Old World genera. The petals united at the base in *Dracæneæ* separate this group from the other two, which are distinguished *inter se* by the insertion of the anthers, and the number, arrangement, and colour of the seeds. Mr. Trelease deals only with the small group *Yucceæ*, which is characterized by having similar subequal withering but persistent perianth-segments, a three-celled ovary with more or less intruded dorsal false septa, many ovules in two ranks in each cell, a subterete elongated embryo placed obliquely across the seed, and germination with arched cotyledon, the seed remaining in or on the soil, instead of being directly carried up on the end of the cotyledon, as commonly happens in *Liliaceæ*.

Five genera are recognized—*Hesperaloe* (2 species), *Hesperoyucca* (1 species), *Clistoyucca* (1 species), *Yucca* (28 species), and *Samuela* (2 species); the last named has been separated by the author from *Yucca* on account of having the perianth distinctly tubular and gamophyllous below. *Clistoyucca* is the *Yucca arborescens* Torr., the Joshua tree of the Mohave Desert region, which Mr. Trelease has raised to generic rank, adopting the sectional name under which Dr. Engelmann had distinguished it from the other species of *Yucca*.

The numerous and excellent plates, a large number of which are photographs from growing plants, are a valuable addition to the descriptive text.

A. B. R.

Das Botanische Practicum. By Eduard Strasburger, Professor of Botany in Bonn University. Edit. 4. 8vo, pp. l, 771, tt. 230. Jena: Fischer. 1902. Price 20 marks.

Prof. Strasburger has taken the opportunity afforded by the call for a new edition of his *Botanische Practicum* to revise the subject-matter and bring it as far as possible up to the level of present knowledge. One can understand, as he explains in his new preface, that the author might well shrink from so formidable an undertaking, considering the rapid growth of botanical literature, and especially of that dealing with microscopical technique, in the last few years. But with the volume before him the student or teacher of the science will not regard as misspent the complete year which had to be devoted to its preparation.

The book is so well known and so widely used throughout the botanical world that it needs no introduction to the botanical public. It is about half as large again as the first edition, published in 1884, and noticed in this Journal for 1885, p. 59. While the scope of the book resembles that of the first edition, the difference in size represents the development which has taken place in various sections, such as those dealing with bacteriology and cell-structure, and also the enormous increase in variety of methods of preparation.

One small point of difference will be noted, namely, the replacement of the familiar "Pensum" at the head of the sections by the less euphonious "Abschnitt." As in the previous edition, that of 1897, which the present closely resembles, there are thirty-two sections, with the same distribution of subject-matter. We note that in the table of contents the most important reagents for use in the work of the section are indicated in addition to the list of material for investigation.

A. B. R.

Types of British Plants. By C. S. Colman. 8vo, pp. xii, 238, with 16 plates, and numerous illustrations in the text. London: Sands & Co. 1902. Price 6s.

This book, one of the "Library for Young Naturalists" series, is planned to fill the gap "between the more advanced manuals for adult readers and the one-syllable picture-books of the nursery." It forms a readable introduction to the study of plant life, including the lower as well as the higher forms, and is much more likely than the great majority of introductions to arouse an interest in botany. It is not in any sense to be regarded as a text-book, and there are many loose and inaccurate statements, especially in the earlier chapters dealing with cell-structure and function, which should have been avoided. The worst feature of the book is in the full-page plates. It seems strange to give as a frontispiece to a book on British plants the "Common Swiss Thistle," and the majority of the plates, though nominally representing endemic species, give a very poor and often misleading idea of the plant. They will, however, supply a certain amusement—hide the name and guess

the plant. You will not, or certainly should not, guess Ragwort for the one opposite p. 70, or Ling for that facing p. 38. The Iris opposite p. 136 is *Iris germanica*, common enough, but not British.

A. B. R.

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*ARTICLES IN JOURNALS.**

Annals of Botany (Sept.; received 15 Oct.). — D. H. Campbell, 'Ganetophyte of *Selaginella*' (1 pl.). — F. C. Newcombe, 'Sensory zone of roots.' — R. J. Harvey-Gibson, 'Anatomy of *Selaginella*' (2 pl.). — F. E. Fritsch, 'Development of *Œdogonium*.' — Id., 'Phytoplankton of the Thames.' — E. M. Freeman, '*Puccinia dispersa*.' — C. W. Hope, 'The 'Sadd' of the Upper Nile.' — G. Brebner, 'Anatomy of *Danæa*' (2 pl.). — W. T. Thiselton-Dyer, 'Polycotyledony' (2 pl.). — F. E. Weiss, 'Vascular branches of Stigmarian rootlets' (1 pl.).

Botanical Gazette (25 Sept.). — E. B. Copeland, 'Rise of the transpiration stream.' — H. P. Chandler, 'Revision of *Nemophila*' (3 pl.).—W. C. Worsdell, 'Evolution of vascular tissue of plants.'—C. MacMillan, 'Classification of seeds.'—D. G. Fairchild, '*Mimosa pudica* as a weed.'

Botanical Magazine (Tōkyō).—(20 Aug.). T. Makino, 'Observations on the Flora of Japan' (cont.).—T. Ichimura, 'Anthocyan formation in leaf organ of *Saxifraga sarmentosa*.' —T. Kawakami, 'Forest Trees of Island of Etorofu' (cont.).

Bot. Zeitung (16 Sept.). — Graf zu Solms-Laubach, '*Isoetes lacustris*' (1 pl.).

Bull. de l'Herb. Boissier (30 Sept.).—H. Christ, 'Filices Faurieanæ.'—J. Freyn, 'Plantæ novæ orientales.'—W. Becker, 'Revision der Violæ des Herb. Barbey-Boissier.' — F. Stephani, 'Species Hepaticarum' (cont.).

Bull. Soc. Bot. France (xlix, 7). — J. Briquet, 'Marc Micheli' (1844–1902). — M. Gandoger, 'Plantes d'Australie.' — G. de Lamarlière, 'Le molybdate d'ammonium comme réactif.' — E. H. Tourlet, 'Deux Rosiers nouveaux d'Inde-et-Loire.' — G. Dismier, '*Jungermannia exsecta* & *J. exsectæformis*.'—M. du Colombier, 'Flore Lichenologique des environs d'Orléans.'

Bull. Torrey Bot. Club (25 Sept.).—C. V. Piper, 'West American species of *Lappula*.'—V. S. White, 'Mount Desert Fungi.'—E. J. Hill, 'Migratory plants.' — E. A. Burt, 'Hymenomycetous fungi from S. America.'—J. S. Cotton, 'New plants from Washington.'

Gardeners' Chronicle (27 Sept.). —C. T. Druery, '*Pteris aquilina cristata*' (figs. 77, 78).—G. Massee, '*Eutypella Prunastri*' (fig. 80). —(25 Oct.). A. Worsley, *Crinum Wimbushi*, *C. Samueli*, spp. nn.

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* The dates assigned to the numbers are those which appear on their covers or title-pages, but it must not always be inferred that this is the actual date of publication.

Journal de Botanique ("Juillet"; received 14 Oct.). — P. van Tieghem, 'Germination et structure de la plantule chez les Coulacées.' — A. de Coincy, 'Enumération des *Echium* de la Flore Atlantique' (cont.). — M. Col, 'Faisceaux médullaires et faisceaux surnuméraires.'

Oesterr. Bot. Zeitschrift (Sept.). — E. Hackel, 'Neue Gräser.'— J. Murr, 'Zur Kenntnis der Eu-Hieracien Tirols' (cont.). — J. Freyn, 'Plantæ Karoanæ' (cont.).

Rhodora (Sept.).—J. R. Jones, 'The Pringle and Frost Herbaria.' —J. F. Collins, '*Iris Hookeri*' (1 pl.). — R. G. Leavitt, 'Seed dispersal of *Viola rotundifolia*.'—A. E. Bacon, '*Anagallis* in Vermont.' —M. L. Fernald, '*Aster undulatus* × *Novi-Belgii*.'

BOOK-NOTES, NEWS, &c.

The National Herbarium has lately acquired the important collections of Hepaticæ, containing about 9000 specimens, of Mr. W. H. Pearson. The British collection is of especial importance, as it contains the type material of the *Hepaticæ of the British Isles*, with numerous notes and sketches; the exotic collection contains the original material elaborated by Mr. Pearson for his paper on the Hepatics of Madagascar, South Africa, Canada, Tasmania, and New South Wales, with types of the new species.

The Rev. H. W. Lett has published "A List, with descriptive notes, of all the species of Hepatics hitherto found in the British Islands" (price 7s. 6d.), which we hope to notice in our next issue.

The Cambridge University Press will shortly publish the first volume, containing the introduction, the Gymnosperms, and the Monocotyledons, of a new introduction to systematic botany by Dr. Rendle. The work, which is entitled "A Systematic Account of the Seed-Plants," is to be in two volumes, and will be fully illustrated.

Sir Harry Johnston's handsome volumes on *The Uganda Protectorate* include a sketch (vol. i. pp. 314–351) of the botany of the region, with a list of the species, drawn up by Mr. C. H. Wright, of the Kew Herbarium. Mr. Wright describes the following new species from Ruwenzori:—*Cymometra Alexandræ*, *Rubus Doggettii*, *Anthriscus dissectus*, *Solanum runzorense*, and *Asplenium amoenum*. Separate lists of Sir H. Johnston's collections on Ruwenzori and Mount Elgon are also given.

The concluding volumes (xiii. & xiv.) of Professor Sargent's magnificent *Silva of North America* are announced for immediate publication; vol. xiv. contains an index to the whole work. It will be succeeded by a similar series entitled *Trees and Shrubs*, illustrating new or little-known woody plants. This will not be confined to North American plants, but will include the woody plants of other regions, especially those of the northern hemisphere which may be expected to flourish in the gardens of the United States and Europe. The first part will be published during the autumn, and will contain twenty-five plates by Mr. C. E. Faxon.

Early in January, 1903, the first number of a new periodical—*Annales Mycologici* "editi in notitiam Scientiæ Mycologicæ Universalis"—will appear, which proposes dealing thoroughly with "the cultivation and furtherance of Mycological Science." Dr. H. Sydow, of Berlin, who is to edit the work, "intends this enterprize to remedy a defect, which must often have been keenly felt by parties interested. . . . The new work will from a literary point of view, form the centre of the whole mycological world. . . . The *Annales Mycologici* are destined to supply a long felt want. In fact every Mycologist will not be able to get on without them, nor will any botanical Museum be able to possess an up-to-date library without taking in the new periodical."

Dr. Adolf Wagner, of Innsbruck, issues a prospectus of a new magazine, of which "the first number shall be issued January the 1st, 1903," to be entitled "*Botanisches Litteraturblatt* (periodical of botanic literature), Organ for Author-reports of the whole domain of botany." "The undersigned venture by this, to give notice of the establishment of the said periodical of botanic literature, kindly begging each and all of home—and foreign botanists, to avail themselves ordinarily of the opportunity offered hereby for timely and prompt publication of self-made reports (Authorreports)." We regret that space will not allow us to reproduce the prospectus in full. We should hardly have thought there was need for another periodical dealing with botanical literature, but of this Dr. Wagner is convinced, at any rate so far as Germany is concerned. He thus expounds "to the P. T. professional, english speaking, colleagues in Botany" the necessity for the new venture. "For the establishment of the periodical paper, herewith announced, a twofold want was of determining influence: in the first place it was the frequent unreliableness and slowliness of indirects reports, which gave cause to the aspiration of amending that by means of authorreports; secondly it was the necessity felt by very many german botanists, to be thoroughly and timely informed of the professional literature of other countries and to bring it into wider circles among german speaking people. A majority of german botanists wishes and is in need of a german report of foreign literature. The present conditions in Germany, which (for want of a unanimously reporting german paper) compel the german botanist, if he intends to keep up with the time in regard to professional literature, to be master of at least two of the foreign languages, are the cause, that such an information of foreign literature, as it ought to be for science sake, cannot be acquired sure and wide enough in german countries. From hence it is, that foreign authors would derive no small profit, if they would take care, that their labours be made accessible in a possibly most trustworthy and easy way for german study (research), which contributes so much towards the advance of science."

We regret to announce the deaths of Mr. C. P. Hobkirk, formerly of Huddersfield, and Mr. H. D. Geldart, of Norwich, of whom notices will appear in our next issue.

Tribe Tylocarpeæ Schm.

Gen. 166. Phyllophora Grev.

P. epiphylla Batt. (= *Fucus epiphyllus* Müll. Fl. Dan. fasc. xi. tab. 708 (March, 1777); *F. prolifer* Lightfoot, Fl. Scot. ii. p. 949, tab. 30 (July, 1777)). (*Note.*—Linnæus's description of *Fucus rubens* is in no way applicable to the present species. In his herbarium there are four specimens preserved under the name *F. rubens*; three of them, pinned together, belong to the present species, the fourth to *Rhodymenia palmata*. It seems to me to be more than probable that Linnæus gave the name *Fucus rubens* to Royen's "Fucus caule tereti ramoso, foliis oblongis undulatis sinuatis difformibus" (Fl. Leyd. p. 514), without ever having seen a specimen of the plant; and subsequently laid into his herbarium, at different times, specimens of two very dissimilar species, believing, at the time of laying in, that each was the plant referred to by Royen. It is worthy of note that Esper understood the Linnean description to refer to *R. palmata* (Esp. Icon. Fuc. p. 148, tab. 75). It is equally doubtful what Hudson's *Fucus crispus* really was. The synonyms given in the first edition of the *Flora Anglica*, p. 472 (1762), would lead one to suppose it was the present species; but in the second edition Hudson adds a reference to the *Fucus crispus* of Linnæus (*Mantissa Plantarum*, p. 134 (1767)), which makes one doubt whether his plant may not have been only a variety of *Chondrus crispus*.) *Distribution.*—Coasts of Cornwall (St. Minver, Padstow, Penzance, Mount's Bay, Falmouth, Looe, Fowey); Devon (Plymouth, Torquay, Exmouth, Sidmouth); Dorset (Weymouth, Swanage); Hants (Isle of Wight); Sussex (Bognor, Worthing, Brighton, Hastings); Kent (Folkestone, Dover, South Foreland, Deal, Ramsgate); Essex (Clacton, Dovercourt); Suffolk (Felixstowe); Norfolk (Yarmouth, Cromer); Yorks. (Filey); Durham (Sunderland, Marsden); Northumberland (Cullercoats, Alnmouth, Holy Island, Berwick). Isle of Man. Wales: Anglesea (Puffin Island). Scotland: Haddington (Dunbar); Edinburgh (Joppa); Fife (Elie, Earlsferry); Forfar (Arbroath); Kincardine (Cove, Stonehaven, Bay of Nigg, Girdleness); Aberdeen (Peterhead); Orkney Islands (Kirkwall Bay); Argyle (Loch Etive, Loch Creran, Lismore); Bute (Isles of Arran, Bute, and Cumbrae); Ayr (Ardrossan). Ireland: Cork (Bantry Bay); Down (Belfast Lough); Galway (Roundstone Bay); Clare (Miltown Malbay, Kilkee); Kerry (Dingle). Channel Islands (Jersey, Guernsey, Alderney). Not uncommon.

P. Brodiæi J. Ag. Coasts of Cornwall (Falmouth, Whitsand Bay, Plymouth); Devon (Torquay); Hants (Isle of Wight); Durham (Marsden); Northumberland (Whitley, Bamborough, Holy Island, Berwick). Wales: Anglesea. Scotland: Haddington (Dunbar, North Berwick, Longniddry); Edinburgh (Joppa, Leith, Caroline Park); Fife (Elie, Earlsferry, Pittenweem); Forfar (Dundee, Firth of Tay); Elgin (Lossiemouth); Orkney Islands (Kirkwall); Bute (Isles of Arran, Cumbrae, and Bute). Ireland: Down (Strangford Lough, Bangor, south side of Belfast Lough); Antrim

(Larne); Derry (mouth of the River Ban). Rather rare.—Var. *angustissima* Ag. Orkney Islands (Loch of Stennis). Very rare.

P. palmettoides J. Ag. Coasts of Cornwall (St. Minver, Mount's Bay, Whitsand Bay); Devon (Plymouth, Torquay, Sidmouth); Sussex (Brighton); Isle of Man. Ireland: Dublin (Malahide). Channel Islands (Guernsey). Rare.

P. Traillii Holm. & Batt. Coasts of Cornwall (Fowey, Plymouth, Mount Edgcumbe); Devon (Torquay); Anglesea (Puffin Island); Northumberland (Holy Island, Berwick). Scotland: Haddington (Dunbar, North Berwick); Edinburgh (Joppa, Granton); Fife (Inchkeith); Orkney Islands (North Ronaldshay); Bute (Isle of Cumbrae). Ireland: Antrim (Torrhead). Probably not uncommon.

P. membranifolia J. Ag, Coasts of Cornwall (St. Minver, Trevone, Mount's Bay, Falmouth, Looe); Devon (Plymouth, Torquay, Teignmouth. Sidmouth); Dorset (Weymouth, Swanage); Hants (Isle of Wight); Sussex (Worthing, Brighton, Hastings); Kent (Dover, Deal); Essex (Clacton, Dovercourt, Harwich); Suffolk (Felixstowe, Corton); Norfolk (Yarmouth); Yorks. (Scarborough); Durham (Sunderland); Northumberland (Cullercoats, Alnmouth, Holy Island, Berwick); Cheshire (Hilbre Island). Wales: Anglesea (Puffin Island), Scotland: Haddington (Dunbar); Fife (Elie, Earlsferry); Forfar (Arbroath); Kincardine (Cove, Stonehaven, Bay of Nigg); Aberdeen (Peterhead); Orkney Islands; Argyle (Loch Goil, Loch Etive. Sound of Kerrara); Bute (Isles of Arran, Bute, and Cumbrae); Ayr (Ardrossan). Ireland: Cork (Bantry Bay, Youghal); Waterford (Dungarvan); Dublin (Kingstown, Howth); Down (Belfast Lough); Antrim (Larne); Galway (Roundstone); Clare (Miltown Malbay, Kilkee). Channel Islands (Jersey, Guernsey). Common.

Gen. 167. Stenogramme Harv.

S. interrupta Mont. Coasts of Somerset (Minehead); Cornwall (Marazion, Bovisand, Mount Edgcumbe); Devon (Plymouth). Ireland: Cork Harbour; Portaferry, Co. Down. Very rare.

Gen. 168. Gymnogongrus Martius.

G. Griffithsiæ Martius. Coasts of Cornwall (St. Minver, Trevone, Padstow, Mount's Bay, Fowey, Mount Edgcumbe); Devon (Torquay, Paignton, Tor Abbey, Dawlish, Exmouth, Sidmouth); Hants (Isle of Wight); Sussex (Brighton, Eastbourne); Essex (Dovercourt); Suffolk (Felixstowe); Cheshire (New Brighton); Isle of Man. Scotland: Orkney Islands (Odin's Bay, Stronsay). Ireland: Cork (Bantry Bay); Dublin (Balbriggan, Malahide). Channel Islands (Guernsey, Alderney). Rather rare.

G. Norvegicus J. Ag. Coasts of Somerset (Minehead); Cornwall (Mount's Bay, Talland Bay, Looe); Devon (Plymouth, Torquay, Exmouth, Sidmouth); Hants (Isle of Wight); Sussex (Brighton, Hastings); Kent (Dover, Deal); Suffolk (Felixstowe); Durham (Sunderland); Cheshire (Hilbre Island); Isle of Man. Wales: Flints (Rhyl); Glamorgan (Swansea). Scotland: Firth of Forth

(Morrison's Haven); Orkney Islands (Kirkwall); Ayr (Saltcoats). Ireland: Cork (Bantry Bay, Youghal); Wicklow; Antrim; Clare (Miltown Malbay). Channel Islands (Jersey, Guernsey). Rather rare.

G. patens J. Ag. (non *Fucus patens* Good. & Woodw.). Coast of Cornwall (Padstow). Very rare.

Gen. 169. Ahnfeltia Fries.

A. plicata Fries (= *Gymnogongrus plicatus* Kütz.). Coasts of Cornwall, Somerset, Devon, Dorset, Hants, Sussex, Kent, Essex, Suffolk, Norfolk, Yorks., Durham, Northumberland, Cheshire, Isle of Man, Wales, Scotland, Ireland, and the Channel Islands. Very common.

Gen. 170. Actinococcus Kütz.

A. subcutaneus Rosenv. (= *A. roseus* Kütz.). Parasitic on *Phyllophora Brodiæi*. Coasts of Cornwall (Falmouth); Devon (Torquay); Northumberland (Whitley, Holy Island, Berwick). Wales: Anglesea. Scotland: Haddington (Dunbar); Elgin (Lossiemouth); Bute (Isle of Cumbrae). Ireland: Galway Bay. Probably to be met with wherever the host-plant is found.

A. aggregatus Schm. Parasitic on *Gymnogongrus Griffithsiæ*. Coasts of Cornwall (Mount's Bay); Devon (Torquay, Sidmouth); Hants (Isle of Wight); Sussex (Brighton); Suffolk (Felixstowe). Probably to be met with wherever the host-plant is found.

A. peltæformis Schm. Parasitic on *Gymnogongrus Norvegicus*. Coasts of Cornwall (Falmouth); Devon (Sidmouth, Torquay); Hants (Isle of Wight); Sussex (Brighton, Hastings); Kent (Deal); Suffolk (Felixstowe). Probably to be met with wherever the host-plant is found.

Gen. 171. Colacolepis Schm.

C. incrustans Schm. Parasitic on *Phyllophora epiphylla*. Coasts of Cornwall (Falmouth); Devon (Torquay); Dorset (Weymouth); Sussex (Bognor); Kent (Deal); Essex (Clacton); Norfolk (Yarmouth); Northumberland (Berwick). Wales. Scotland. Ireland, and the Channel Islands. Probably to be found wherever the host-plant occurs.

Gen. 172. Sterrocolax Schm.

S. decipiens Schm. Parasitic on *Ahnfeltia plicata*. Not uncommon wherever the host-plant is found.

Tribe Callymenieæ Schm.

Gen. 173. Callophyllis Kütz.

C. laciniata Kütz. (= *Rhodymenia laciniata* Grev.). Coasts of Cornwall (St. Minver, Scilly Islands, Portluney, Penzance Lizard, Mount's Bay, Falmouth, Looe); Devon (Plymouth, Torquay, Exmouth, Sidmouth); Dorset (Weymouth, Swanage); Hants (Isle of Wight); Suffolk (Corton near Lowestoft); Norfolk (Yarmouth); Yorks. (Scarborough); Durham (Sunderland); Northumberland (Alnmouth, Holy Island, Berwick). Wales: Anglesea (Puffin Island). Scotland: Haddington (Dunbar, North Berwick); Fife

(Dirleton, Inchkeith, Elie); Forfar (Arbroath); Aberdeen (Peterhead); Moray Firth (Campbeltown); Orkney Islands (Kirkwall); Argyle (Machrihanish Bay, South end, Kintyre); Bute (Arran); Iona, Mull; Ayr (Saltcoats, Ardrossan). Ireland: Cork (Bantry Bay, Youghal); Waterford (Dungarvan); Dublin (Kingstown, Balbriggan); Down (Belfast Lough); Antrim (Larne, Portrush); Clare (Kilkee, Miltown Malbay). Channel Islands (Jersey, Guernsey, Alderney). Not uncommon.

C. flabellata Crn. Coast of Cornwall (Porth Loo, Scilly Islands). West coast of Ireland (Kilkee, Co. Clare). Very rare.

Gen. 174. Callocolax Schm.

C. neglectus Schm. Parasitic on *Callophyllis laciniata*. Coasts of Cornwall (Falmouth); Devon (Plymouth); Dorset (Weymouth, Swanage); Northumberland (Berwick). Scotland: Argyle (Campbeltown); Bute (Isle of Arran). Ireland: Clare (Kilkee). Probably not uncommon.

Gen. 175. Callymenia J. Ag.

C. reniformis J. Ag. Coasts of Cornwall (Scilly Islands, Marazion, Land's End, Falmouth, Whitsand Bay, Torpoint); Devon (Plymouth, Torquay, Ilfracombe); Hants (Isle of Wight). Scotland: Argyle (Machrihanish Bay); Orkney Islands (Skaill Bay). Ireland: Cork (Bantry Bay); Down (Bangor); Antrim (Glenarm); Londonderry (Mouth of the Ban); Clare (Kilkee, Miltown Malbay); Kerry (Dingle). Channel Islands (Jersey, Guernsey, Alderney). Rare.— *α undulata* J. Ag. Coasts of Cornwall (Scilly Islands) and Devon (Torquay). Very rare.— *β cuneata* J. Ag. Coasts of Cornwall (Falmouth) and the Orkney Islands (Skaill Bay, Papa Westra). Rare. — *γ Ferrarii* J. Ag. Coasts of Devon (Plymouth, Torquay, Ilfracombe) and Orkney Islands (Skaill). Channel Islands (Guernsey). Rare.

C. microphylla J. Ag. (= *Meredithia microphylla* J. Ag. Analecta, p. 74). Coasts of Devon (Ilfracombe), Hants (Isle of Wight), and Carnarvon (Bangor). Very rare.

Family Rhodophyllidaceæ Schm.

Tribe Cystocolonieæ Schm.

Gen. 176. Cystoclonium Kütz.

C. purpureum Batt. (= *Fucus purpureus* Huds. Fl. Angl. p. 471 (1762); *F. tuberculatus* Lightfoot, Fl. Scot. ii. p. 926 (1777) (non Huds. Fl. Angl. ed. 2, p. 588 (1778); *F. purpurascens* Huds. *l. c.* ed. 2, ii. p. 589 (1778); *Cystoclonium purpurascens* Kütz.; *Hypnea purpurascens* Harv.). Coasts of Cornwall (Trevone, St. Minver, Mount's Bay, Falmouth, Gerran's Bay); Devon (Plymouth, Torquay, Dawlish, Exmouth, Sidmouth); Dorset (Weymouth, Swanage); Hants (Isle of Wight); Sussex (Bognor, Worthing, Brighton); Kent (Dover, Deal); Essex (Clacton, Harwich); Suffolk (Felixstowe); Norfolk (Yarmouth, Runton); Yorks. (Scarborough); Durham (Sunderland); Northumberland (Cullercoats, Alnmouth, Holy Island, Berwick); Cheshire (Hilbre Island); Isle of Man. Wales: Anglesea (Puffin Island); Carnarvon (Bangor). Scotland:

Haddington (Dunbar, Longniddry); Edinburgh (Caroline Park, Newhaven); Fife (Inchkeith, Elie, Earlsferry); Forfar (Arbroath); Orkney Islands (Kirkwall Bay); Argyle (Loch Etive, Oban, Loch Goil); Bute (Isles of Arran, Bute, and Cumbrae); Ayr (Ayrheads). Ireland: Generally distributed and abundant. Channel Islands (Jersey, Guernsey, Alderney). Common and abundant on most parts of the British coast. — *β cirrhosa* (J. Ag.). Coasts of Sussex (Worthing); Dorset (Weymouth); Northumberland (Berwick). Ireland: Dublin (Balbriggan). Rather rare.

Gen. 177. Catenella Grev.

C. repens Batt. (= *Fucus repens* Lightfoot, Fl. Scot. ii. p. 961 (1777), e spec. orig. in Herb. Kew.; *F. Opuntia* Gooden. & Woodw. in Linn. Soc. Trans. vol. iii. p. 219 (1797); *Catenella Opuntia* Grev.). Coasts of Somerset (Minehead, Clevedon); Cornwall (St. Michael's Mount, Fowey); Devon (Plymouth, Torbay, Salcombe, Sidmouth); Dorset (Studland); Hants (Isle of Wight); Sussex (Hastings); Kent (Dover); Essex (Estuary of Blackwater, Maldon); Norfolk (Cley); Durham (Seaham, Roker, Marsden); Northumberland (Berwick); Isle of Man; Cheshire (Eastham, Hilbre Island). Wales: Anglesea (Puffin Island); Pembroke (Tenby). Scotland: Haddington (Dunbar, North Berwick, Longniddry); Edinburgh (Musselburgh, Caroline Park); Fife (Inchkeith, Earlsferry, Elie, Kincraig, Pittenweem); Forfar (Arbroath); Kincardine (Bay of Nigg); Orkney Islands (Skaill, Kirkwall); Ross-shire (Kessen Ferry); Argyle (Dunstaffnage); Bute (Isle of Cumbrae); Ayr (Ardrossan). Ireland: Cork (Bantry Bay); Dublin Bay. Channel Islands (Jersey, Guernsey). Not uncommon on the rocky parts of the British Islands.

Gen. 178. Euthora J. Ag.

E. cristata J. Ag. (= *Rhodymenia cristata* Grev.). Coast of Northumberland (Cullercoats, Berwick). Scotland: Haddington (Dunbar); Firth of Forth; Caithness (Wick); Orkney Islands (Elwick Harbour); Shetland Island (Voe of Sound near Lerwick). Very rare.

Tribe Rhodophyllideæ Schm.

Gen. 179. Rhodophyllis Kütz.

R. bifida Kütz. (= *Rhodymenia bifida* Grev.). Coasts of Cornwall (Boscastle, Padstow, Mount's Bay, Falmouth, Talland Bay, Torpoint); Devon (Plymouth, Ilfracombe, Torquay, Budleigh, Sidmouth); Dorset (Weymouth, Swanage); Hants (Isle of Wight); Sussex (Brighton); Kent (Deal); Suffolk (Corton near Lowestoft); Norfolk (Yarmouth); Northumberland (Berwick); Isle of Man. Wales: Anglesea (Puffin Island). Scotland: Haddington (North Berwick); Fife (Elie); Orkney Islands (Kirkwall); Argyle (Lismore); Bute (Isles of Arran and Cumbrae); Ayr (Ardrossan, Saltcoats, West Kilbride). Ireland: Cork (Bantry Bay); Wicklow; Down (Belfast Lough); Clare (Malbay, Kilkee). Channel Islands (Jersey, Guernsey, Alderney). Not uncommon on the southern shores of England, and those of the west, south, and east of Ireland.—*β incrassata* Harv. (var. *latifrons* Holm. & Batt.). Coasts of

Cornwall (Porth Loo, St. Mary and Bryher, Scilly Islands) and Devon (Torquay). Ireland: Antrim (Carrickfergus). Rare.

R. appendiculata J. Ag. (= *Rhodymenia bifida* var. *ciliata* Harv.). Coasts of Cornwall (Pridmouth, Mount's Bay); Devon (Bovisand, Ilfracombe, Torbay); Dorset (Weymouth, Swanage); Sussex (Brighton); Kent (Deal); Orkney Islands (Kirkwall). Ireland: Down (Belfast Lough); Antrim (Carrickfergus). Channel Islands (Jersey, Guernsey). Rare.

Series Rhodymeninæ Schm.

Family Sphærococcaceæ Schm.

Tribe Sphærococceæ Schm.

Gen. 180. Sphærococcus Grev.

S. coronopifolius Grev. Coasts of Cornwall (Scilly Islands, Pridmouth, Penzance, Mount's Bay, Falmouth, Looe); Devon (Plymouth, Torquay, Sidmouth); Dorset (Portland, Weymouth, Swanage); Hants (Isle of Wight); Sussex (Brighton); Isle of Man. Scotland: Moray Firth; Orkney Islands (Kirkwall); Bute (Isles of Arran, Cumbrae, and Bute); Ayr (Ardrossan, West Kilbride, Heads of Ayr). Ireland: Cork (Bantry Bay); Down (Belfast Lough); Antrim (Larne); Clare (Miltown Malbay). Channel Islands (Jersey, Guernsey, Alderney). Not uncommon on the southern shores of England, the south and west of Ireland, and the Channel Islands; very rare elsewhere in Britain.

Tribe Gracilarieæ Schm.

Gen. 181. Gracilaria Grev.

G. confervoides Grev. (= *G. dura* Tellam, non Ag.). Coasts of Cornwall (Padstow, St. Minver, Penzance, Falmouth, Looe); Devon (Plymouth, Torquay, Teignmouth, Sidmouth); Dorset (Weymouth, Swanage); Hants (Isle of Wight); Sussex (Brighton, Eastbourne); Kent (Deal); Essex (Harwich); Suffolk (Corton near Lowestoft); Norfolk (Runton); Northumberland (Alnmouth, Bamborough, Berwick); Cheshire (Hilbre Island); Isle of Man. Wales: Anglesea (Puffin Island). Scotland: Argyle (Loch Etive); Bute (Cumbrae); Orkney Islands (Skaill), Ireland: Cork (Bantry Bay); Dublin Bay; Antrim (Portrush); Clare (Miltown Malbay, Kilkee). Channel Islands (Jersey, Guernsey, Alderney).—*β procerrima* (Turn.). Coasts of Devon (Sidmouth); Dorset (Weymouth); Anglesea (Holyhead); Bute (Cumbrae). — *γ gracilis* (Turn.) (= *F. gracilis* Stackh.; *Gracilaria divergens* Holm. & Batt. Rev. List, non J. Ag.). Coasts of Devon (Dawlish, Torquay) and Sussex (Brighton). Rare.

G. compressa Grev. Coasts of Cornwall (Penzance); Devon (Dawlish, Exmouth, Sidmouth); Dorset (Weymouth, Studland); Hants (Isle of Wight); Sussex (Brighton). Channel Islands (Jersey). Very rare.

G. multipartita J. Ag. Coasts of Cornwall (Whitsand Bay, Torpoint, Tait's Hill) and Devon (Plymouth, Salcombe, Wembury).

Gen. 182. Calliblepharis Kütz.

C. ciliata Kütz. (= *Rhodymenia ciliata* Grev.). Coasts of Cornwall (Padstow, St. Minver, Mount's Bay, Falmouth, Fowey); Devon (Ilfracombe, Plymouth, Torbay, Dawlish); Dorset (Weymouth, Swanage); Hants (Isle of Wight); Kent (Dover, Deal, Ramsgate); Essex (Clacton, Harwich, Dovercourt); Suffolk (Felixstowe); Norfolk (Yarmouth); Yorks. (Scarborough); Durham (Hartlepool); Cheshire (Hilbre Island); Isle of Man. Wales: Anglesea (Puffin Island). Scotland: Argyle (Loch Etive); Iona; Orkney Islands (Elwich Harbour, Shapinsha); Bute (Isles of Cumbrae and Arran). Ireland: Cork (Bantry Bay); Down (Belfast Lough); Galway (Roundstone Bay). Channel Islands (Jersey, Guernsey). Not uncommon on the shores of the south of England, and the south and west of Ireland; rare in Scotland.—*β angusta* Holm. & Batt. Coasts of Essex (Clacton) and Kent (Deal).

C. lanceolata Batt. (= *Fucus lanceolatus* Stackh. in Wither. Bot. Arr. ed. 3, vol. iv. p. 104 (1796), e spec. auth. in Herb. Linn. Soc.; *F. Jubatus* Gooden. & Woodw. in Linn. Soc. Trans. vol. iii. p. 162 (1797); *Rhodymenia Jubata* Grev.). Coasts of Cornwall (Scilly Islands, Mount's Bay, Looe, Fowey); Devon (Plymouth, Ladran Bay, Sidmouth, Torquay, Exmouth, Salcombe); Dorset (Chapman's Pool, Swanage); Hants (Isle of Wight); Norfolk (Yarmouth); Isle of Man. Scotland: Kincardine coast; Orkney Islands (Shapansey, Kirkwall); Dumbarton (Helensburgh); Bute (Isles of Cumbrae and Arran); Ayr (Ballantrae). Ireland: Cork (Bantry Bay); Clare (Miltown Malbay, Kilkee). Channel Islands (Jersey, Guernsey, Alderney). Not uncommon on the coasts of the south of England and the Channel Islands, and the south and west of Ireland.—*β divaricata* Holm. & Batt. Coasts of Devon and Dorset. Rather rare.—*γ dilatata* Holm. & Batt. Coasts of Cornwall, Devon, and Dorset. Rather rare.

Family Rhodymeniaceæ Schm.

Tribe Rhodymenieæ Schm.

Gen. 183. Rhodymenia J. Ag.

R. Palmetta Grev. f. *typica* (= *Fucus Palmetta* Stackh. Ner. Br. t. 16). Coasts of Cornwall (St. Minver, Mount's Bay, Lizard, Falmouth, Fowey); Devon (Ilfracombe, Plymouth, Torquay, Sidmouth; Dorset (Weymouth); Hants (Isle of Wight); Sussex (Hastings); Kent (Deal). Wales: Anglesea (Puffin Island). Scotland: Orkney Islands (Kirkwall Bay); Bute (Isles of Arran and Cumbrae); Ayr (Portincross, Saltcoats). Ireland: Cork (Bantry Bay); Clare (Kilkee, Miltown Malbay). Channel Islands (Jersey, Guernsey, Alderney). Not uncommon on the shores of Southern England and the Channel Islands, and the south and west of Ireland. — f. *bifida* (Turn.). South coast of England. Not uncommon.—f. *crassiuscula* (Turn.) (= f. *latifolia* Crn.). Coast of Cornwall (St. Minver, Scilly Islands). — f. *flabelliformis* Kütz. Coasts of Cornwall (Scilly Islands); Devon (Torquay, Sidmouth); Dorset (Weymouth); Kent

(Deal). Ireland: Clare (Kilkee). Rather rare.—f. *divaricata* Kütz. South coast of England. — Var. *β Elisiæ* Chauv. (= *Rhodymenia Nicæensis* Holm. Rev. List, p. 91; *R. Palmetta* var. *Nicæensis* J. Ag.). Coasts of Cornwall (Pridmouth); Devon (Torquay, Sidmouth); Sussex (Hastings); Kent (Deal). Rare.

R. corallicola Ardiss. Flor. Ital. p. 55, pl. ix. Coast of Kent (Deal, Feb. 1900, J. T. Neeve). Very rare.

R. palmata Grev. f. *typica*. Coasts of Somerset, Cornwall, Devon, Dorset, Hants, Sussex, Kent, Essex, Suffolk, Norfolk, Yorks., Durham, Northumberland, Cheshire, Isle of Man, Wales, Scotland, Ireland, and the Channel Islands. Very common.—f. *marginifera* Harv. Coasts of Devon, Dorset, Sussex, &c., and the Orkney Islands. Common. — f. *sarniensis* Grev. Coasts of Dorset (Weymouth), Orkney Islands (Skaill, Loch of Stennis), and the Channel Islands (Jersey, Guernsey). Not uncommon. — f. *simplex* J. Ag. Common.—f. *sobolifera* J. Ag. Coasts of Cornwall (St. Minver); Devon (Torquay). Scotland: Orkney Islands (Loch of Stennis). Ireland: Dublin (Kingstown); Down (Strangford Lough, Portaferry); Antrim (Glenarm); Galway (Arran Island). Channel Islands (Jersey, Guernsey). Rather rare. — f. *laciniata* Holm. & Batt, Coasts of Devon (Torquay); Northumberland (Berwick). Scotland: Orkney Islands (Kirkwall Bay) and Bute (Isle of Arran). Ireland: Galway (Roundstone Bay). Rather rare.

Gen. 184. Cordylecladia J. Ag.

C. erecta J. Ag. (= *Gracilaria erecta* Grev.). Coasts of Cornwall (Falmouth); Devon (Plymouth, Torquay, Dawlish, Exmouth, Sidmouth); Hants (Isle of Wight); Sussex (Brighton, Hastings); Kent (Folkestone). Scotland: Edinburgh (Joppa); Orkney Islands (Kirkwall Bay). Ireland: Down (Bangor); Antrim (north side of Belfast Lough, Port Ballantrae); Galway (Roundstone Bay). Rare.

Gen. 185. Lomentaria Lyngb.

L. articulata Lyngb. (= *Chylocladia articulata* Grev.). Coasts of Cornwall (Scilly Islands, Penzance, Falmouth, St. Minver, Fowey); Devon (Plymouth, Torquay, Dawlish, Sidmouth); Dorset (Weymouth, Swanage); Hants (Isle of Wight); Sussex (Brighton); Kent (Dover, Deal); Norfolk (Cromer); Yorks. (Scarborough); Durham (Sunderland); Northumberland (Cullercoats, Almouth, Holy Island, Berwick); Lancs. (Walney Island); Cheshire (Hilbre Island, Eastham, New Brighton); Isle of Man. Wales: Anglesea (Puffin Island). Scotland: Haddington (Dunbar, Longniddry); Fife (Largo, Earlsferry, Elie); Forfar (Arbroath); Kincardine (Stonehaven); Aberdeen (Peterhead); Orkney Islands (Skaill); Argyle (Isles of Jura, Iona, Oransay and Canay, Lismore, Loch Creran); Isle of Skye; Bute (Isles of Arran, Bute, and Cumbrae); Ayr (Ardrossan). Ireland: Cork (Bantry Bay); Waterford (Dungarvan Bay); Wicklow; Dublin (Kingstown); Down (Strangford Lough); Antrim coast; Galway (Roundstone Bay). Channel Islands (Jersey, Guernsey, Alderney). Not uncommon.

L. clavellosa Gaill (= *Chrysymenia clavellosa* Harv.). Coasts of Cornwall (Trevone, St. Minver, Mount's Bay, Falmouth, Torpoint); Devon (Plymouth, Torquay, Salcombe, Exmouth, Sidmouth); Dorset (Weymouth, Studland); Hants (Blackgang, I. W.); Sussex (Bognor, Brighton); Kent (Deal); Suffolk (Corton near Lowestoft); Norfolk (Yarmouth); Yorks. (Filey, Whitby); Durham (Sunderland); Northumberland (Cullercoats, Alnmouth, Holy Island, Berwick); Isle of Man. Scotland: Haddington (Dunbar); Edinburgh (Caroline Park); Fife (Inchkeith, Largo, Anstruther); Forfar (Arbroath); Kincardine (Stonehaven); Elgin (Lossiemouth); Orkney Islands; Bute (Isles of Cumbrae, Arran, and Bute); Ayr (Ardrossan); Dumbarton (Helensburgh). Ireland: Cork (Bantry Bay); Dublin (Clontarf, Howth); Antrim (Larne, Portrush); Clare (Kilkee). Channel Islands (Jersey, Guernsey). Not uncommon. — *β sedifolia* Harv. Coasts of Cornwall (Falmouth), Northumberland (Berwick), Elgin (Lossiemouth), and Cork (Bantry Bay). Rather rare.

L. rosea Thur. (= *Chrysymenia rosea* Harv.). Coasts of Cornwall (Boscastle, St. Minver, St. Michael's Mount, Mount Edgcumbe); Devon (Plymouth, Torquay); Kent (Ramsgate); Yorks. (Filey, Scarborough); Northumberland (Berwick). Very rare.— *β orcadensis* Harv. Coast of Orkney (Skaill). Very rare.

Gen. 186. Champia Lamour.

C. parvula Harv. (= *Chylocladia parvula* Hook.). Coasts of Cornwall (St. Minver, Trevone, Mount's Bay, Penzance); Devon (Plymouth, Torquay, Sidmouth); Dorset (Weymouth, Swanage); Hants (Isle of Wight); Sussex (Brighton, Littlehampton); Isle of Man. Scotland: Orkney Islands; Bute (Isles of Arran and Cumbrae); Ayr (Saltcoats). Ireland: Cork (Bantry Bay); Wicklow coast; Antrim (Portrush); Galway (Roundstone Bay); Clare (Miltown Malbay, Kilkee). Channel Islands (Jersey, Guernsey, Alderney). Not uncommon on the southern shores of England and the south-west of Scotland; common on the Irish coast and that of the Channel Islands. — Var. *implexa*. Cornish coast (St. Minver, &c.). Rather rare.

Gen. 187. Chylocladia Grev.

C. kaliformis Hook. Coasts of Cornwall, Devon, Dorset, Hants, Sussex, Kent, Essex, Suffolk, Norfolk, Yorkshire, Durham, Northumberland, Isle of Man, Wales, Scotland, Ireland, and the Channel Islands. Not uncommon.—Var. *β patens* Harv. Coasts of Devon, Sussex, Orkney, Down, and Antrim. Rather rare. — Var. *γ squarrosa* Harv. Coasts of Devon, Dorset, Galway, and the Channel Islands. Rather rare.

C. ovatus Batt. (= *Fucus ovatus* Huds. Fl. Angl. p. 468 (1762); *F. vermicularis* Gmelin, Hist. Fuc. p. 162, tab. 18, fig. 4 (1768); Lightfoot, Fl. Scot. ii. p. 958 (1777); *F. ovalis* Huds. *l. c.* ed. 2, p. 573 (1778); *Chylocladia ovalis* Hook.). Coasts of Cornwall, Devon, Dorset, Hants, Sussex, Kent, Suffolk, Yorkshire, Isle of Man, Orkney Islands (Papa Westra), S.W. Scotland (Isles of Jura,

Dunstaffnage, Dunoon), N., W., and S. coasts of Ireland, and the Channel Islands. Not uncommon.—Var. *β subarticulata* (= *Gastroclonium subarticulatum* Kütz.). Coast of Devon (Sidmouth, Torbay). Very rare.

C. reflexa Lenorm. Coasts of Cornwall (Mount's Bay, Falmouth, St. Minver); Devon (Ilfracombe, Plymouth, Torquay, Exmouth, Sidmouth); Sussex (Brighton). Channel Islands (Guernsey). (Obs.—The Irish locality in Phyc. Br. is incorrect: see Harv. Man. ed. 2, p. 102.)

Tribe Plocamieæ Schm.

Gen. 188. Plocamium Lyngb.

P. coccineum Lyngb. *α angustifrons* Le Jol. and *β latifrons* Le Jol. Common everywhere on the shores of the British Islands.— *γ uncinatum* Ag. Coasts of Devon (Torbay, Sidmouth, Plymouth); Hants (West Cowes); Norfolk (Cromer); Northumberland (Berwick). Scotland: Loch Etive, Isle of Cumbrae. Rare.

Fam. Delesseriaceæ Schm.

Tribe Nitophylleæ Schm.

Gen. 189. Nitophyllum Grev.

N. punctatum Grev. Coasts of Cornwall (Padstow, Mount's Bay, Falmouth, Torpoint); Devon (Plymouth, Torquay); Dorset (Weymouth, Swanage); Hants (Isle of Wight); Sussex (Brighton); Norfolk (Cromer); Northumberland (Almouth, Berwick); Cheshire (New Brighton); Isle of Man. Wales (Swansea). Scotland: Haddington (Dunbar, Longniddry); Fife (Elie); Forfar (Arbroath); Kincardine (Stonehaven); Aberdeen (Peterhead); Caithness (Wick); Orkney Islands; Argyle (Lismore); Bute (Isles of Arran, Cumbrae, and Bute); Ayr (Ardrossan). Ireland: Cork (Bantry Bay); Antrim (Larne, Cushendall); Galway (Roundstone Bay); Clare (Kilkee, Miltown Malbay). Channel Islands. Not uncommon, though rather local.—Var. *β ocellatum* J. Ag. Cornwall (St. Minver, Penzance); Devon (Plymouth, Ilfracombe, Torbay, Sidmouth); Northumberland (Cullercoats, Whitley, Berwick). Scotland: Banff; Elgin (Forres); Orkney Islands. Ireland (Bantry Bay). Channel Islands. Rare. —Var. *γ crispatum* Harv. Devon (Mt. Batten); Northumberland (Berwick); Orkney Islands (Kirkwall). Ireland (Roundstone, Kilkee). Rare. — Var. *δ Pollexfenii* Harv. (= *N. alliaceum* Tellam, Mar. Alg. Cornw. 1884, p. 336). Cornwall (Torpoint); Orkney Islands (Kirkwall). Very rare.—Var. *ζ fimbriatum* Harv. Orkney Islands; Roundstone Bay. Very rare. — Var. *ζ reniforme* J. Ag. Orkney Islands (Kirkwall). Very rare.

N. Bonnemaisoni Grev. Coasts of Somerset (Minehead); Cornwall (Mount's Bay, Falmouth, Mount Edgcumbe); Devon (Plymouth, Ilfracombe, Torbay, Dartmouth, Sidmouth); Northumberland (Berwick). Scotland: Haddington (Dunbar); Aberdeen (Peterhead); Orkney and Shetland Islands; Bute (Isles of Bute and Cumbrae); Ayr (Fairlie). Ireland: Cork (Bantry, Youghal); Waterford (Tramore); Down (Strangford Lough); Antrim (Larne); Clare (Miltown Malbay, Kilkee). Channel Islands (Jersey). Rare. — Var.

β crassinervia Batt. Scilly Islands; Berwick; Orkney Islands; Kilkee. Very rare.

N. versicolor Harv. Coasts of Somerset (Minehead); Cornwall (Mount's Bay); Devon (Ilfracombe, Plymouth). Ireland (Youghal). Very rare.

N. uncinatum J. Ag. Coasts of Devon (Sidmouth); Dorset (Swanage); Hants (West Cowes); Orkney Islands (Skaill). Ireland (Murlough Bay and Kilkee). Channel Islands. Very rare.

N. venulosum Zan. (= *N. thysanorhizans* Holm.). Coast of Cornwall (Torpoint and Mount Edgcumbe). Very rare.

N. Sandrianum Zan. Coasts of Somerset (Minehead); Devon (Torbay). Very rare.

N. Gmelini Grev. Coasts of Somerset (Minehead); Cornwall (Mount's Bay, Lizard, Falmouth, Torpoint); Devon (Plymouth, Torbay, Teignmouth, Exmouth, Sidmouth, Ilfracombe); Dorset (Weymouth, Swanage); Hants (Isle of Wight); Sussex (Brighton); Kent (Folkestone, Deal); Norfolk (Cromer). Scotland: Orkney Islands (Skaill); Bute (Cumbrae); Ayr (Ardrossan). Ireland: Cork (Bantry); Dublin (Howth); Antrim (Larne, Murlough Bay); Clare (Kilkee). Channel Islands. Not uncommon on the S. and W. of England, and the N. and W. of Ireland; very rare in Scotland.

N. ramosum Batt. (= *Ulva ramosa* Huds. Fl. Angl. p. 476 (1762); *Fucus crispatus* Huds. *l. c.* ed. 2, p. 580, e spec. auth. in Herb. Kew.; *F. laceratus* Gmel. Hist. Fuc. p. 179, t. 21, fig. 4 (1768); *N. laceratum* Grev.). Common on the coasts of Cornwall, Devon, Dorset, Hants, Sussex, Kent, Essex (Harwich), Suffolk, Norfolk, Yorks., Durham, Northumberland, Cheshire, Wales, Scotland, Ireland, and the Channel Islands.—f. *ciliifera* (Kütz.). Not uncommon.—f. *lobata* (Kütz.) (= f. *latifrons* Crn.). Coasts of Cornwall and Devon. Rather rare.—Var. *β uncinatum* (Grev.) (non *N. uncinatum* J. Ag.). Coasts of Cornwall (St. Minver, Lizard); Devon (Ladran Bay); Dorset (Weymouth); Sussex (Brighton). Scotland (Orkney Islands). Ireland (Kilkee). Rare.—Var. *γ Smithii* (Kütz.). South of England and the Orkney Islands. Not uncommon.

N. reptans Crn. Coasts of Cornwall (Pridmouth, near Fowey); Devon (Sidmouth); Kent (Deal). Scotland (Arran, Cumbrae). Ireland (Dungarvan Bay, Co. Waterford). Rare.

N. Hilliæ Grev. Coasts of Cornwall (Scilly Islands, Mount's Bay, Falmouth, Fowey, Whitsand Bay); Devon, Ilfracombe, Plymouth, Dartmouth, Torbay, Sidmouth); Hants (Isle of Wight). Scotland (Orkney Islands). Ireland: Cork (Bantry Bay); Kerry (Valentia Island); Clare (Miltown Malbay). Channel Islands. Rather rare on the south coast of England and west of Ireland; very rare in Scotland.

N. litteratum J. Ag. Coasts of Cornwall (Scilly Islands); Devon (Torbay). Very rare.

Gen. 190. Gonimophyllum Batt.

G. Buffhami Batt. Coasts of Cornwall (Scilly Islands); Devon (Sidmouth); Dorset (Weymouth, Swanage); Kent (Deal). Ireland (North side of Belfast Lough; Galway). Rare.

Gen. 191. Phycodrys Kütz.

P. rubens Batt. (= *F. rubens* Huds. Fl. Angl. p. 475 (1762); *F. crenulatus* Gmel. Hist. Fuc. p. 184, t. 24, fig. 1 (1768); *F. roseus* Müll. Fl. Dan. t. 652 (1775); *F. sinuosus* Gooden. & Woodw. Linn. Trans. iii. p. 111 (1797); *Delesseria sinuosa* Lamour.). Coasts of Cornwall, Devon, Dorset, Hants, Sussex, Kent, Suffolk, Norfolk, Yorks., Durham, Northumberland, Cheshire, Isle of Man, Wales, Scotland, Ireland, and the Channel Islands. Common. — Var. *β Quercifolia* (Turn.). South of England and Scotland. Rather rare.—Var. *γ lingulata* (J. Ag.). Coast of Argyle (Loch Fyne). Rare.

Tribe Delesserieæ Schm.

Gen. 192. Delesseria Lamour.

D. sanguinea Lamour. (= *Hydrolapathum sanguineum* Stackh.). Coasts of Somerset, Cornwall, Devon, Dorset, Hants, Sussex, Kent, Essex (Harwich), Suffolk, Norfolk, Yorks., Durham, Northumberland, Cheshire, Wales, Scotland, Ireland, and the Channel Islands. Common.

D. alata Lamour. Common on almost all the British coasts.

D. angustissima Griff. Coasts of Yorkshire (Filey, Scarborough); Durham (Sunderland); Northumberland (Berwick). Scotland: Aberdeen (Peterhead); Elgin (Lossiemouth); Cromarty Firth; Orkney Islands. Ireland: Kingstown, Co. Dublin; coast of Galway. (*Obs.*—This species has also been recorded from Cornwall and Devon, but it is very unlikely to be found there.)

D. ruscifolia Lamour. Coasts of Cornwall (St. Minver, Trevone, Mount's Bay, Falmouth, Fowey, Mount Edgcumbe); Devon (Plymouth, Torbay, Exmouth, Sidmouth, Ilfracombe); Dorset (Weymouth, Portland, Swanage); Hants (Isle of Wight); Sussex (Bognor, Brighton); Suffolk (Corton, near Lowestoft); Norfolk (Cromer); Durham (Seaham, Sunderland); Northumberland (Whitley, Berwick); Isle of Man. Scotland: Orkney Islands; Bute (Isles of Arran and Cumbrae); Ayr (Saltcoats). Ireland: Cork (Bantry Bay); Wicklow; Clare (Kilkee, Miltown Malbay). Channel Islands. Rather rare.

D. hypoglossum Lamour. *α Woodwardii* Hauck. Coasts of Cornwall, Devon, Dorset, Hants, Sussex, Kent, Suffolk (Felixstowe, Corton); Norfolk (Yarmouth, Cromer); Yorks. (Scarborough); Durham (Sunderland); Northumberland (Whitley, Alnmouth, Berwick); Isle of Man; Anglesea; Glamorgan (Swansea). Scotland: Edinburgh (Caroline Park, Joppa); Fife (Elie); Forfar (Arbroath); Bute (Isles of Arran, Bute, and Cumbrae); Ayr (Ardrossan). Ireland: Cork (Bantry Bay); Down (Belfast); Antrim (Larne). Channel Islands. Not uncommon on the shores of England, Ireland, and the Channel Islands; rare in Scotland.—Var. *β oralifolia* J. Ag. Orkney Islands (Skaill). Rare. — Var. *γ glomerata* Chauv. Coasts of Dorset (Weymouth); Orkney (Skaill). —Var. *δ arborescens* J. Ag. Coasts of Cornwall (Falmouth); Devon (Torbay); Orkney Islands (Kirkwall). — Var. *ε crispa* Crn. Cornwall (Falmouth). — Var. *ζ angustifolia* Kütz. Dorset (Weymouth, Swanage); Bute (Cumbrae); Jersey (Grouville Bay). Rare.

Fam. Bonnemaisoniaceæ Schm.

Gen. 193. Bonnemaisonia Ag.

B. asparagoides Ag. Coasts of Cornwall (Scilly Islands, Mount's Bay, Penzance, Falmouth, Looe, Torpoint); Devon (Plymouth, Torbay); Dorset (Swanage); Hants (Isle of Wight); Suffolk (Corton); Norfolk (Yarmouth, Cromer, Sheringham); Durham (Sunderland); Northumberland (Whitley, Almouth, Berwick); Isle of Man. Scotland: Haddington (Dunbar); Fife (Elie); Aberdeen (Peterhead); Moray Firth; Orkney Isles (Kirkwall, Skaill); Argyle (Loch Fyne, Machrihanish Bay, and Southend, Kintyre); Bute (Isles of Arran and Cumbrae); Ayr (Saltcoats, Ardrossan). Ireland: Cork (Bantry Bay); Wicklow; Dublin (Kingstown, Howth, Malahide); Down (Donaghadee, Bangor, Belfast); Antrim (Carrickfergus); Clare (Quilty, Miltown Malbay, Kilkee). Channel Islands. Rare. — Var. *β teres* Harv. Wicklow and Kingstown Harbour, Co. Dublin.

B. hamifera Hariot. Coasts of Cornwall (Falmouth); Hants (Shanklin, I. W.); Devon (Torquay, Aug. 1902, E. A. B.). Rare.

Fam. Rhodomelaceæ Schm.

Tribe Rhodomeleæ Schm.

Gen. 194. Bostrychia Mont.

B. scorpioides Mont. Coasts of Cornwall (Fowey); Devon (Plymouth, Trevol, Salcombe, Dartmouth); Dorset (Portland, Weymouth); Sussex (Selsea, Shoreham); Essex (Wivenhoe, Maldon); Cambs (Tydd Marsh); Suffolk (Felixstowe); Norfolk (Yarmouth, Cley). Wales (Point of Ayr, Flints; Dolgelly; Barmouth). Ireland (Port Stewart, Co. Londonderry; Tarbert, Co. Kerry; Baldoyle). Channel Islands (Jersey). Local.

Gen. 195. Rhodomela Ag.

R. subfusca Ag. Coasts of Cornwall, Devon, Dorset, Hants, Sussex, Kent, Essex, Suffolk, Norfolk, Yorks., Durham, Northumberland, Cheshire, Wales, Somerset, Scotland, Ireland, and the Channel Islands. Common. — Var. *β gracilior* J. Ag. Berwick, Bute, Kirkwall. Rare.—Var. *γ firmior* J. Ag. Torquay, Falmouth, Kirkwall, Jersey. Rare.

R. lycopodioides Ag. Coasts of Cornwall (St. Minver, Falmouth); Norfolk (Cromer); Northumberland (Newbiggen, Alnmouth, Holy Island, Berwick); Cheshire (Eastham); Isle of Man. Scotland: Coasts of Berwickshire, Haddington, Edinburgh, Fife, Forfar, Kincardine, Aberdeen, Banff, Elgin, the Orkney and Shetland Islands, Caithness, Ross, Argyle, Ayr. Ireland: Co. Dublin (Balbriggan); Down (Bangor); Antrim (Larne); Londonderry (Port Stewart). Common on the shores of Scotland and of the north of England and Ireland. — Var. *β laxa* Kjellm. Northumberland (Berwick); Orkney (Kirkwall). Not uncommon.

Gen. 196. Odonthalia Lyngb.

O. dentata Lyngb. Coasts of Yorkshire (Scarborough); Durham (Sunderland); Northumberland (St. Mary's Isle, Cullercoats, Aln-

mouth, Holy Isle, Berwick); Isle of Man. Scotland: Generally distributed. Ireland: Antrim (north side of Belfast Lough, Larne, Giant's Causeway). Common on the shores of Scotland and Northern England and Ireland.

Tribe Laurencieæ Schm.

Gen. 197. Laurencia Lamour.

L. obtusa Lamour. *α genuina* Hauck. Coasts of Cornwall (Mount's Bay, Falmouth); Devon (Plymouth, Torbay, Exmouth); Dorset (Weymouth, Swanage); Hants (Isle of Wight); Sussex (Bognor, Brighton, Hastings); Yorks. (Flamborough Head); Durham (Sunderland); Isle of Man. Wales: Glamorgan (Worm's Head). Scotland: Firth of Forth; Orkney Islands; Argyle (Loch Etive, Falls of Lora, Kintyre); Bute (Isles of Arran and Cumbrae); Ayr (Ardrossan, Portincross, Ballantrae); Solway Firth. Ireland: Cork (Bantry); Dublin (Ireland's Eye); Down (Bangor). Channel Islands. Not uncommon.—Var. *crucifera* Hauck. Coast of Dorset (Weymouth, Swanage).—Var. *pyramidata* J. Ag. Cornwall (Scilly Islands); Dorset (Chapman's Pool, Swanage). Rare.

L. cæspitosa Lamour. Coasts of Cornwall, Devon, Dorset, Hants, Sussex, Kent, Essex, Suffolk, Yorks., Durham, Northumberland, Wales (Anglesea), Scotland, Ireland, and the Channel Islands. Common.

L. pinnatifida Lamour. Coasts of Somerset, Cornwall, Devon, Dorset, Hants, Sussex, Kent, Norfolk, Yorks., Durham, Northumberland, Isle of Man, Wales, Scotland, Ireland, and the Channel Islands. Common and abundant almost everywhere on the British coasts.—Var. *β osmunda* Harv. and var. *γ litoralis* Harv. Common.

Tribe Amansieæ Schm.

Gen. 198. Halopithys Kütz.

H. incurvus Batt. (= *F. incurvus* Huds. Fl. Angl. p. 470 (1762); *F. pinastroides* Gmel. Hist. Fuc. p. 127 (1768); *Rytiphlæa pinastroides* Ag.). Coasts of Cornwall (Falmouth, Whitsand Bay); Devon (Plymouth, Torquay, Sidmouth, Axmouth, Lyme Regis); Dorset (Weymouth, Swanage); Hants (Isle of Wight, Portsmouth); Sussex (Bognor, Brighton, Hastings); Kent (Deal); Norfolk (Cromer). Channel Islands. Not uncommon on the southern shores of England and those of the Channel Islands.

Tribe Polysiphonieæ Schm.

Gen. 199. Chondria Ag.

C. tenuissima Ag. (= *Laurencia tenuissima* Harv.). Coasts of Cornwall (Falmouth); Devon (Bovisand, Torbay); Dorset (Weymouth, Swanage, Studland); Hants (Isle of Wight); Sussex (Brighton); Isle of Man. Scotland: Bute (Isle of Arran); Ayr (Saltcoats). Ireland: Cork (Ballycotton); coast of Waterford. Channel Islands. Rare.

C. dasyphylla Ag. (= *Laurencia dasyphylla* Grev.). Coasts of Cornwall (Trevone, Mount's Bay, Mount Edgcumbe); Devon (Plymouth, Torquay, Teignmouth, Exmouth, Sidmouth, Dawlish);

Dorset (Portland, Weymouth); Hants (Christchurch, Isle of Wight); Sussex (Brighton); Kent (Dover, Deal); Essex (Harwich); Suffolk (Felixstowe, Corton); Norfolk (Yarmouth, Cromer, Sheringham); Wales (near Swansea). Scotland: Aberdeen (Peterhead); Elgin (Lossiemouth); Orkney Islands (Skaill); Bute (Isles of Arran, Cumbrae, and Bute); Ayr (Ardrossan). Ireland: Generally distributed. Channel Islands.—Var. *β squarrosa*. Devon (Plymouth); Dorset (Weymouth); Sussex (Brighton).

C. cærulescens J. Ag. Coasts of Sussex (Hastings); Suffolk (Felixstowe). Rare.

Gen. 200. Polysiphonia Grev.

P. macrocarpa Harv. (= *P. pulvinata* Phyc. Br. and *P. sertularioides* Holm. & Batt. Rev. List). Coasts of Cornwall (Padstow, Mount's Bay, Sennen Cove, Falmouth, Fowey); Devon (Ilfracombe, Plymouth, Torbay); Dorset (Portland, Swanage); Hants (Isle of Wight); Sussex (Brighton); Northumberland (Berwick); Cheshire (Hilbre Island). Wales (Anglesea). Scotland: Orkney Islands (North Ronaldsay); Bute (Isle of Cumbrae); Ayr (Ardrossan, Saltcoats). Ireland: Dublin (Balbriggan); Londonderry (Port Stewart); Clare (Miltown Malbay). Channel Islands. Not uncommon.

P. Rhunensis Thur. Cornwall (Trevone Bay); Devon (Ilfracombe, Plymouth). Rare.

P. fibrata Harv. Coasts of Cornwall, Devon, Dorset, Hants, Sussex, Kent, Northumberland, Cheshire (Hilbre Island), Isle of Man, Wales, Scotland, Ireland, and the Channel Islands. Not uncommon.

P. urceolata Grev. *α typica* J. Ag. Coasts of Cornwall, Devon, Dorset, Hants, Sussex, Kent, Norfolk, Yorks., Durham, Northumberland, Cheshire (Hilbre Island), Isle of Man, Wales, Scotland, Ireland, and the Channel Islands. Common.—Var. *β patens* J. Ag. Cornwall, Devon, Cheshire (Hilbre Island), Northumberland (Alnmouth, Berwick), Orkney Islands, Bute (Isles of Cumbrae and Arran). — Var. *γ formosa* J. Ag. (= *P. formosa* Suhr). Coasts of Cornwall, Devon, Dorset, Hants, Sussex, Norfolk, Northumberland. Scotland: Haddington, Edinburgh, Fife, Orkney and Shetland Islands, Bute, Ayr. Ireland: Dublin (Malahide, Clontarf); Down (Strangford Lough, Belfast Lough). Not uncommon. — Var. *δ comosa* J. Ag. (= *P. stricta* Grev.). Devon (Plymouth, Torquay, Sidmouth); Dorset (Studland); Northumberland (Berwick). Not uncommon.

P. divaricata Kütz. Joppa, near Edinburgh; and Murlogh Bay, Co. Antrim. Rare.

P. subulata J. Ag. *β Griffithsiana* J. Ag. (= *P. Griffithsiana* Harv.). Coasts of Devon (Torquay); Dorset (Isle of Portland). Very rare.

P. Richardsoni Hook. Coast of Kirkcudbright (Colvend). Very rare.

P. spinulosa Grev. Coast of Argyle (Appin). Very rare.— Var. *β major* J. Ag. (= *P. Carmichaeliana* Harv.). Coasts of Argyle (Appin); Bute (Little Cumbrae); Orkney (Skaill). Very rare.

P. elongella Harv. Coasts of Cornwall (Padstow, Falmouth, Talland Bay, Torpoint); Devon (Plymouth, Torbay, Sidmouth); Dorset (Weymouth, Swanage); Hants (Isle of Wight); Sussex (Bognor, Brighton); Isle of Man; Anglesea. Scotland: Fife (Elie); Aberdeen (Peterhead); Orkney Islands (Kirkwall Bay); Bute (Arran, Cumbrae); Ayr (Ardrossan, Seamill, Saltcoats); Argyle (Kirn). Ireland: Cork (Bantry); Dublin (Howth, Malahide, Killiney); Antrim (Larne, Belfast Lough). Channel Islands (Jersey). Rather rare, though widely distributed.

P. elongata Grev. Coasts of Cornwall, Devon, Dorset, Hants, Sussex, Kent, Essex, Norfolk, Yorks., Durham, Northumberland, Cheshire (Hilbre Island), Isle of Man, Wales, Scotland, and Ireland. Channel Islands (Jersey). Common. — Var. *β rosea* J. Ag. (= *P. rosea* Grev.; *P. elongata* var. *sanguinolenta* Harv.). Not uncommon in spring.—Var. *γ denudata* Grev. Common in autumn and winter.

P. violacea Grev. (incl. *P. Grevillei* Harv.). Coasts of Cornwall, Devon, Dorset, Hants, Sussex, Kent, Durham (Roker), Northumberland (Whitley, Berwick); Isle of Man. Wales (Carnarvon). Scotland: Fife (Elie, Earlsferry); Aberdeen (Peterhead); Orkney Islands; Bute (Arran, Bute, Cumbrae). Ireland: Cork (Bantry); Dublin (Howth); Galway (Roundstone); Kerry (Ferriter's Cove). Channel Islands. Rather rare.—Var. *β allochroa* J. Ag. Cornwall (Falmouth); Devon (Torquay). — Var. *γ subulata* Hauck. Dorset (Portland).

P. fibrillosa Grev. Coasts of Cornwall (St. Minver, Mount's Bay, Falmouth, Looe); Devon (Plymouth, Torquay, Sidmouth, Seaton); Dorset (Weymouth, Swanage); Hants (Isle of Wight); Sussex (Shoreham, Brighton); Norfolk (Cromer); Durham (Roker); Northumberland (Whitley, Berwick); Isle of Man; Anglesea. Scotland: Haddington (Dunbar); Fife (Earlsferry); Kincardine (Stonehaven); Orkney Islands; Argyle (Loch Goil); Bute (Isles of Arran, Bute, and Cumbrae); Ayr (Saltcoats). Ireland: Cork (Bantry); Dublin (Howth); Down (Bangor); Galway (Roundstone); Clare (Miltown Malbay). Channel Islands (Jersey, Alderney). Not uncommon.

P. variegata Zan. Coasts of Cornwall (St. Minver, Torpoint); Devon (Plymouth); Dorset (Weymouth); Hants (Isle of Wight); Sussex (Brighton). Very rare.

P. fœtidissima Cocks (= *P. stuposa* Ralfs in Penzance Nat. Hist. Soc. Proc. 1884, p. 325). Coasts of Cornwall (Newlyn West, Falmouth); Devon (Plymouth); Sussex (Brighton). Very rare.

P. furcellata Harv. *a patula* J. Ag. Coasts of Cornwall (Falmouth): Devon (Plymouth, Torquay, Sidmouth); Dorset (Weymouth, Studland); [Norfolk coast, *fide* Geldart]. Ireland: Antrim (Carrickfergus); Galway (Roundstone), Channel Islands (Jersey). Very rare. — Var. *β forcipata* J. Ag. (= *P. turgidula* Holm. fasc. no. 71). Falmouth. Very rare.

P. fastigiata Grev. Very common on the shores of the British Islands wherever its host-plant (*Ascophyllum nodosum*) grows.

P. ceramiæformis Crn. Coasts of Cornwall (Falmouth) and Dorset (Weymouth, Swanage). Very rare.

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British and Foreign

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Fig. 1.

Fig. 2

Fig. 3.

Fig. 4.

A NEW SENECIO HYBRID.

A NEW SENECIO HYBRID (× S. ALBESCENS).

By F. W. Burbidge, M.A., and Nathaniel Colgan, M.R.I.A.

(Plate 444.)

Amongst the many alien species established in the Co. Dublin flora, few are more interesting than the Mediterranean Ragwort known to botanists under the names *Senecio Cineraria* DC. and *Cineraria maritima* L. It is now about a quarter of a century since Sir Francis Brady, Bart., sowed seeds of the plant in his garden near Dalkey, and adjoining Sorrento Cliffs, as the rocky crescent forming the northern limit of Killiney Bay is not inappropriately called. So congenial did this sheltered sea-nook prove to the southern stranger, that it slowly but steadily pushed its way by wind-borne seeds right round the sweep of rock, until finally it succeeded in almost monopolizing it from crest to high-water mark with its ample trusses of silvery-white foliage. To-day, the plant is a conspicuous feature of the coast at this point, so much so that it arrests the attention of even the unbotanical traveller as he journeys by rail from Bray to Kingstown.

In the summer of 1901, one of us, who has paid special attention to hybrids and hybridizing, observed what to less practised eyes would have seemed aberrant forms of this alien *Senecio* growing in Sorrento Park, a small enclosure of rocky ground which lies inland from the cliffs, and at certain points approaches them to within a stone's-throw. The aspect of these plants at once suggested to him a natural hybrid, and this suggestion was strengthened by the presence close at hand of likely parents in the common Ragwort (*Senecio Jacobæa* L.) and of its Mediterranean congener, *S. Cineraria* DC. The suggestion was not followed up at the time: the plants were variable, and it seemed probable that at least some of them were rather shade-grown states of the Mediterranean species than the result of its natural crossing with our common Ragwort.

Early in the present year, however, we both agreed that these puzzling intermediates were deserving of further study. We accordingly paid many visits in company to the cliffs and their neighbourhood, gathered a full series, in various stages of growth, of the suspected hybrid and of its probable parents, carefully noted their range and habit in the field, and finally compared, both in fresh and dried specimens, their minuter distinctions in flower and seed. The result was to convince us that the intermediates first noticed by one of us in 1901 were indeed the outcome of a natural crossing of *Senecio Cineraria* DC. with *S. Jacobæa* L. This conviction may be said to be based on circumstantial rather than on direct evidence, since the extreme practical difficulty in the way of producing artificial hybrids in such a genus as *Senecio*

forbade any attempt to check our conclusion by the crucial experiment of making hybrids similar to those we found ready-made at Dalkey.

The available evidence may be most conveniently considered under two heads—first, evidence derived from the observed combination or fusion in the intermediates of various characters of their assumed parents; second, evidence derived from the peculiar distribution of the intermediates in relation to their parents.

Taking these heads of evidence in order, it may be noted in the first place that the intermediates through all their diversities—and they vary greatly in their degree of approach to *S. Jacobæa* on the one hand, or to *S. Cineraria* on the other—preserve certain obvious distinctive characters by which they may be discriminated at a glance. The stems and leaves and involucres are always less tomentose than in *S. Cineraria* and more so than in *S. Jacobæa*, while the inflorescence is always more leafy and the leaves themselves more finely divided than in the former species, though less so than in the latter. The general tone of colour of the foliage, too, is sufficient in itself to distinguish the three plants even at some distance, *S. Cineraria* being white, *S. Jacobæa* fresh green, and the intermediate grey, partly by reason of the underlying green showing through the thin layer of tomentum, partly from the colour of the tomentum itself. Eight visits were paid to the cliffs and the adjacent sea-banks in the interval between June 6th and August 28th of this year, and the result of careful observation was to show that the order of flowering of the three plants was—first, *S. Cineraria;* second, the intermediate or hybrid; and last, *S. Jacobæa*. Flower-buds showed clearly on the first two plants on June 6th, while no trace of them was to be seen on the neighbouring *S. Jacobæa;* on June 14th a few heads of *S. Cineraria* were in full flower, and some of the intermediates' buds had just begun to show the yellow of the opening ray-florets; on July 7th many heads of *S. Cineraria* and a few of the intermediates were in full flower, while the yellow of the opening ray-florets of *S. Jacobæa* had just began to appear; on July 24th all three plants were well in flower.

Two leading forms of the intermediate were readily distinguishable. These may be called *a* and *b*. In *a*, the corymb-branches were divaricate, and, so far, the form approached *S. Cineraria;* but in other characters, and notably in the tenuity of the tomentum on stem and leaves and in the leafiness of the corymb-branches, it suggested *S. Jacobæa*, to which species it came closer in general aspect. Similarly, with form *b* there was the same conflict of tendencies, the same hesitation about taking a decided line. The ascending habit of its corymb-branches was strongly reminiscent of *S. Jacobæa*, but the comparative nakedness of its less ample inflorescence and the greater density of the tomentum on stem and leaf gave the form a general aspect of *S. Cineraria*. Of the two forms, *a* was by far the more distinct and the more frequent, and we have no hesitation in selecting it as the typical hybrid.

The points just touched on are the more obvious field-marks of

the hybrid. A fuller statement of its distinctive characters and of those of the parent species will now be given. At this stage the necessity of naming the plant presents itself, and the questions arise—is it nondescript? and, if not, has its hybrid origin been previously proved or suggested? Focke, in his *Pflanzen-Mischlinge*, makes no reference to any such hybrid. Neither Boissier (*Flor. Orient.*) nor Willkomm and Lange (*Prod. Flor. Hisp.*) mentions any variety of *S. Cineraria* as occurring either in the eastern or in the western Mediterranean region. Tenore, indeed (*Ind. Sem. Hort. Neapol.*), has a *Cineraria ceratophylla*, but this appears to be merely a variety in which the leaves are white above, and not shining green or sparingly pilose as in the typical plant. Nyman, however (*Conspect.* p. 350), places as subspecies under *C. maritima* a *C. calvescens* (Moris & De Not.), the name suggesting a plant less densely tomentose than *C. maritima*. We are indebted to the courtesy of the Director of Kew Gardens for a transcript of the characters of this plant and for a tracing of a figure from the work in which it was first published, the *Florula Capprariæ* of Moris and De Notaris, a Latin flora of the Italian island of Caprera, printed in the Acts of the Royal Academy of Sciences of Turin in 1839. Both plate and distinctive characters of the Caprera plant agree rather closely with the form *b* of the Irish hybrid; but the plate represents something widely different from the form *a*, which is the prevalent and characteristic one at Dalkey. The authors of the *Florula Capprariæ* describe *S. calvescens* as a species, and make no suggestion of hybridism. Indeed, a hybrid origin for the Caprera plant seems improbable, for, although both *S. Cineraria* and *S. Jacobæa* occur in the Italian island, they appear there under conditions highly unfavourable to the production of a natural hybrid. The habitat of the first species is given in the *Florula* (p. 74) as "in rupestribus littoreis": the second is set down as very rare, and occurring (only as a variety of the type) "in herbidis secus rivulos," while the authors state that they have not seen the plant in flower. We have had no opportunity of comparing the form *b* of our Dalkey plant with Caprera specimens of *S. calvescens*, of which there are none in Kew Herbarium, so that we cannot as yet decide whether the plants be identical. So widely, however, does the characteristic form *a* of our hybrid differ from the figure of the Caprera plant, that it seems to deserve a distinctive name. The specific adjective *albescens* being apparently unappropriated in either of the genera *Cineraria* and *Senecio*, we venture to propose for this interesting Irish hybrid the name × **Senecio albescens.**

The following statement of the distinctive characters of *S. albescens* and of its parents is founded on an examination of numerous fresh and dried specimens of all three plants, of which fairly typical examples are reproduced in the plate accompanying this paper:—

Senecio Cineraria DC.

Perennial and subfruticose; stems, corymb-branches, involucres, and under side of leaves clothed with densely felted, white tomentum; leaves petioled, coarsely pinnatifid, the segments usually with entire margins towards the base, and bluntly lobed towards the extremity, the limb of the leaves much inflexed so as to expose the white under surface; flowering stems with a few distant leaves above, rising from amongst ample trusses of barren leafy shoots; inflorescence almost naked, corymb-branches divaricate; ray-florets broadly ligulate, averaging $\frac{4}{3\,2}$ in. in breadth and $\frac{9}{3\,2}$ in. in length, the tubular portion with an average length of $\frac{6}{3\,2}$ in.; fertile seeds numerous, smooth.

Senecio Jacobæa L.

Biennial and herbaceous; stems usually glabrous and purplish; leaves sessile, semi-amplexicaul, with laciniate auricles, fresh green, glabrous or sparingly pubescent, the segments irregularly and much lobed throughout; corymb-branches ascending, their upper parts, the pedicels, and the base of the involucres with greyish pubescence; inflorescence densely leafy; ray-florets narrowly ligulate, averaging $\frac{2}{3\,2}$ in. in breadth and $\frac{1\,1}{3\,2}$ in. in length, the tubular portion with an average length of nearly $\frac{4}{3\,2}$ in.; fertile seeds numerous, those of the ray smooth, of the disc pilose.

× *Senecio albescens.*

Biennial and herbaceous; stem, corymb-branches, involucre, and under side of leaves covered with a thinly spread grey tomentum, the stems occasionally purplish below; leaves pinnatifid, amplexicaul, and auricled, the segments much lobed; corymb ample, with divaricate branches, leafy, but less so than in *S. Jacobæa;* ray-florets averaging $\frac{4}{3\,2}$ in. in breadth and nearly $\frac{1\,2}{3\,2}$ in. in length, the tubular portion with an average length of $\frac{5}{3\,2}$ in.; perfect seeds infrequent, those of the ray smooth, of the disc obscurely pilose.

To come now to the second branch of the evidence—that is to say, evidence drawn from the distribution of the hybrid and of its parents—it was found that on the Sorrento Cliffs, properly so called, only one *Senecio* occurred, the alien *S. Cineraria* DC. Here there was no Common Ragwort (*S. Jacobæa*), and no hybrids of either form. But passing from the cliffs proper to the railway embankment on which they abut at their western extremity, at the point where the line pierces a spur of the Dalkey granite hills with a short tunnel, both the Common Ragwort and the hybrids at once began to appear, mingled with typical *S. Cineraria.* Passing along southward towards the Vico bathing-place, *S. Cineraria* and the hybrid *b* both grew rarer and rarer, until they almost ceased at the bathing-place. Thence for nearly a quarter of a mile farther south-westward along the steep cliffs capped with drift both *S. Jacobæa* and the hybrid *a* (*S. albescens*) continued to appear in association, *S. Cineraria* being quite absent from the latter half of this distance. The inland extension of *S. albescens* was small. Several plants appeared in

Sorrento Park above the cliffs; others appeared by the roadway above the railway at Vico; others again near Cooliemore Harbour, about a furlong north of the cliffs; some even on the summit of the hill above Khyber Pass, *S. Jacobæa* in all of these stations occurring close by. But the headquarters of *S. albescens* were along the railway-banks and sea-banks at and near Vico bathing-place, and along the cliffs and banks by the sea to the south-westward.

On the assumption of a hybrid origin for the intermediates, it seems at first rather hard to account for their peculiar absence from Sorrento Cliffs, where one of the parents grows in such abundance, and at some points within a stone's-throw of the other parent. The pollen of both of the assumed parent species is equally adapted for wind- or insect-carriage. Cross-fertilization must have been effected by either agency, and it seems just as inadmissible to assume the winds to have blown persistently from *S. Cineraria* towards *S. Jacobæa*, as to assume the honey-seeking insects (bees, most probably) to have invariably travelled in the same direction. Both the winds and the bees must have frequently travelled in the reverse direction, carrying the pollen of *S. Jacobæa* to the stigmas of *S. Cineraria*, perhaps as often as they carried the pollen of the latter species to the stigmas of the former. And this being so, does not the absence of intermediates, it may be argued, from the cliffs where *S. Cineraria* reaches its maximum, show that the suggested formation of hybrids does not really take place? If we assume, however—what has long since been proved for other species capable of producing hybrids—that there is a want of reciprocity of cross-fertilization between *S. Cineraria* and *S. Jacobæa*, the difficulty disappears. The pollen of *S. Cineraria* may be able to fertilize the ovules of *S. Jacobæa*, while the pollen of the latter is inert as regards the ovules of the former. There may be, in short, a perfectly free interchange of pollen between the two species, while the fertilizing effect is quite one-sided. The parentage of the hybrid, then, should be thus expressed—♂ *S. Cineraria* DC. × ♀ *S. Jacobæa* L.

The appearance of *S. albescens* in Ireland affords a most interesting example of the disturbing influence which may be exercised by the introduction of a new element into a flora already in a state of equilibrium. The alien *Senecio Cineraria* from the shores of the Old World sea has not merely succeeded in founding a vigorous colony a thousand miles northward of the Pillars of Hercules; it has contracted an alliance there with a native species equally vigorous and aggressive, and the fruit of the union has been a new race in which the characters of both parents are happily blended. Whether this new race will show itself capable of self-perpetuation yet remains to be seen. The fact that it produces, though in small quantity, freely germinating seeds would suggest that it may have this power of self-perpetuation; and, should this prove so, then a new species or subspecies of hybrid origin may be said to have been born on the shores of Killiney Bay.

This is the second instance of an alien *Senecio* from Southern Europe having hybridized naturally with a native species in Ireland. The first instance, as is well known to Irish botanists, is to be found

in the plant detected by Isaac Carroll near Cork in 1853, named by Syme as a variety of the common groundsel, but subsequently set down by Dr. Focke as a natural crossing of that species with *S. squalidus* L.

Explanation of Plate 444.

Fig. 1.—*Senecio Jacobæa* L., from a specimen gathered at Portmarnock, Co. Dublin, July 14th, 1902.

Fig. 2.—*S. Cineraria* DC., from a specimen gathered at Sorrento Cliffs, Dalkey, Co. Dublin, July 24th, 1902.

Fig. 3.—× *S. albescens*, a hybrid between *S. Cineraria* and *S. Jacobæa*, approaching more closely to the latter. From a specimen gathered on the sea-banks at Vico, Dalkey, July 24th, 1902.

Fig. 4.—A hybrid of like parentage with *S. albescens*, but more closely approaching *S. Cineraria*. Perhaps identical with *S. calvescens*. From a specimen gathered July 24th, 1902, at Vico, where it grows in association with *S. albescens*.

All of the above figures about one-third natural size, and photographed from herbarium specimens, in which the form of the flowers is very imperfectly shown.

ALABASTRA DIVERSA.—Part X.

By Spencer Moore, F.L.S.

Note on Salvia Russellii Benth.

This species was described by Bentham in De Candolle's *Prodromus* (vol. xii. p. 357), the type being a specimen in the British Museum collected at Aleppo towards the end of the eighteenth century by Dr. Patrick Russell. It is placed in the section *Hemisphace* near *S. verticillata* L., Bentham remarking, "Flores omnino *S. verticillatæ*, sed minores. Folia fere *S. pomiferæ* [i.e. oblong instead of cordate-lyrate]. Species distinctissima." Bentham, however, took what it is submitted was a wrong step in tacking on to *S. Russellii* a var. *β*, founded on Aucher Eloy No. 1842, and Kotschy No. 102. It is this variety which usually does duty for *S. Russellii* in herbaria, and which, judging from the number of specimens representing it, must be a fairly common plant; indeed, a note accompanying a Sivas specimen recently presented to the British Museum by Colonel Maunsell states that it is common over Eastern Turkey. The chief peculiarities of *S. Russellii* as distinguished from *S. verticillata* reside, as noted by Bentham, in the shape of the leaves and in the small flowers; on the other hand, the alleged var. *β* has not these small flowers, but the large ones of *S. verticillata*, and, but for the leaves, it is impossible to distinguish the two. Typical *S. Russellii* would appear to be a very rare plant, for not only is there no indication of Boissier's having been acquainted with it, but a search at Kew has revealed the fact of its absence from that collection, neither is there another specimen of it at the Museum. In fact, this seems to be a case—and there are more such at the Museum than would be thought at all likely—of

a plant, gathered during the eighteenth century, which has eluded the search of subsequent collectors.

Bornmüller's No. 4167, which is *S. Russellii* var. *β* in all respects, was distributed as *S. Bornmülleri* Hausskn., a name which, unless I err, has not been published, at least I can find no reference to its publication. Anyway, I am of opinion that, *S. Russellii* var. *β* being so different from typical *S. Russellii*, Haussknecht's name should be used for the former plant, which, in fact, occupies a middle position between *S. verticillata* and *S. Russellii*, as it possesses the flowers of the one and the foliage of the other; and the three species may be briefly distinguished as follows:—

Folia cordato-lyrata. Calyx obconicus, comparate elongatus. Corolla calycem bene excedens .	*S. verticillata.*
Folia oblonga. Calyx et corolla *S. verticillatæ* .	*S. Bornmülleri.*
Folia oblonga. Calyx subcampanulatus, brevis. Corolla calycem paullulum excedens . . .	*S. Russellii.*

On laying moistened corollas of *S. Bornmülleri* and *S. Russellii* side by side, the following points may be noted:—

S. Bornmülleri.—Calyx 0·6 cm. long, its anterior teeth deltoid-acuminate, nearly 0·15 cm. long. Corolla-tube 0·8 cm. long; upper lip 0·4 cm. long; lateral lobes much shorter than mid-lobe of lower lip.

S. Russellii.—Calyx 0·4 cm. long, its anterior teeth shortly subulate, barely 0·1 cm. long. Corolla-tube 0·5 cm. long; upper lip a little over 0·2 cm. long; lateral lobes of lower lip nearly as long as the mid-lobe.

Two imperfectly known Species of Barleria.

Through the kind courtesy of Prof. Perceval Wright, I have been able to examine the types of two of Anderson's species of *Barleria* preserved in the herbarium of Trinity College, Dublin. Since Anderson's time no one has quite known what to make of these plants, and Mr. Clarke, who has recently dealt with them in the *Flora of Tropical Africa*, while referring one of them to a Welwitschian species described by myself, has been compelled to place the second among the imperfectly known species at the end of the genus. I must premise that the notes which follow are based upon external examination alone; for the specimens are very scrappy, and, although in one case there is a flower in a capsule, I did not feel justified in asking for leave to dissect it. In spite of this, however, I think the conclusions here stated are trustworthy.

1. B. lancifolia T. And. Mr. Clarke refers this to my *B. alata*, but this would appear to be wrong, although the two species are undoubtedly closely allied. The chief peculiarities of *B. lancifolia* lie in its smaller and narrower leaves, its narrower and more rigid therefore less leaf-like bracts, and, above all, in the quite different corolla, which has, as Anderson described it, a tube remarkably short for its breadth, being 1·8 cm. long, and at 0·4 cm. above the base suddenly widening to 0·5 cm., and so upwards until at the throat it measures upwards of a centimetre across. The tube of

B. alata may reach 2·0 cm. in length, though it is often but little longer than that of *B. lancifolia*, and it is much narrower and gradually dilated upwards to the throat, which is only 0·6 cm. across. Then the corolla-lobes of the Damara-land plant are broadly obovate, subequal, scarcely 1·5 cm. long and almost or quite as broad, as contrasted with those of *B. alata*, which are oblong, 1·7 cm. long, and only 0·7 cm. broad. The stamens of *B. lancifolia*, it may be added, are very shortly exserted, the oblong anthers having a length of 0·3 cm.

The two plants have so different an appearance when laid side by side that nobody could suppose them to be conspecific.

2. B. DAMARENSIS T. And. The type-specimen is a small scrap about eight centimetres in length, with two fully developed calyces and a single mature corolla. It may be described thus:—

Verisimiliter suffruticosa caule erecto folioso minutissime canopubescente, foliis parvis anguste ovato-oblongis mucronatis basi in petiolum brevem desinentibus puberulis firme membranaceis, floribus solitariis binisve, bracteis parvis patenti-recurvis late subulatis apice breviter spinosis integris rarissime marginibus semel debiliter spinoso-dentatis viridibus, calycis bracteas bene excedentis lobis majoribus inter se subæqualibus oblongo-lanceolatis spinoso-acuminatis breviter spinoso-dentatis nonnunquam subintegris minute griseo-pubescentibus reticulato-nervosis anticis omnino connatis, lobis minoribus anguste lineari-lanceolatis acutis quam majores paullo brevioribus, corollæ verisimiliter violaceæ vel violascentis tubo cylindrico minutissime puberulo quam calyx longiore limbo subæqualiter 5-lobo, filamentis longe exsertis.

Foliorum lamina circa 1·0 cm. long. et 0·5 cm. lat.; petiolus 0·2 cm. long., 0·1 cm. lat., facie superiori late excavata. Bracteæ 0·4–0·7 cm. long., deorsum parum dilatatæ, rigidæ. Calycis lobi majores 1·1–1·3 cm. long., 0·3–0·45 cm. lat. Corollæ tubus paullo ultra 2·0 cm. long., 0·2 cm. diam.; limbi pansi 2·0 cm. diam. lobi obovato-oblongi, circa 1·0 cm. long. Filamenta adusque 0·6 cm. exserta.

Anderson described the larger calyx-lobes as entire, but, although this is *almost* the case with the lower of the two flowers, the lobes of the other are manifestly dentate. There can therefore be no reasonable doubt that the affinity of this plant is with *B. Marlothii* Engl., which also may have entire as well as dentate calyx-lobes. *B. Marlothii* is different in leaf, has longer and narrower bracts, larger and broader discoloured calyx-lobes, &c.

AMPHORANTHUS SPINOSUS S. Moore (*vide ante*, p. 305).

Dr. H. Harms, of Berlin, has kindly called my attention to a memoir by Prof. Radlkofer in the *Bremen Abhandlungen*, vol. viii., wherein, under the name of *Phæoptilum spinosum*, is described in most elaborate fashion a plant agreeing closely in its floral characters with my recently published *Amphoranthus spinosus*. Radlkofer enjoyed the advantage of having ripe fruit for examination; and, in spite of the undoubtedly ventral attachment of the ovule, he referred his

plant—and I think correctly—to *Nyctagineæ*. Dr. Harms was good enough to send me some flowers of *P. spinosum*, and one of a supposed second species—*P. Heimerli* Engl.; he also tells me that Prof. Heimerl has recently prepared a monograph of *Nyctagineæ* for the *Denkschriften Akad. Wien*, which, however, has not yet found its way to the British Museum Library, and that in this monograph are distinguished, besides the type, a var. β (*P. Heimerli* Engl.) and also a var. γ. The species is therefore a very variable one.

The chief peculiarity about the flowers of *Amphoranthus spinosus* is their possession of nine stamens, *P. spinosum* and *P. Heimerli* having eight only. *P. spinosum*, moreover, was originally described by Radlkofer as unisexual; but this is by no means always the case —*e. g.* the three flowers sent by Dr. Harms are all bisexual. As for the staminode described by me, I am now inclined to consider it merely the lower part of a broken filament, as buds show only nine stamens all perfect, and one of the latter must have been counted twice over. *A. spinosus* has also a longer staminal tube and a longer stalk to the ovary than *P. spinosum*, but in these two points *P. Heimerli* agrees exactly with it. The stigma of *A. spinosus* is often small, as represented in the figure (tab. 441 A, fig. 2), though occasionally larger, and showing, when crushed, the laciniæ described by Radlkofer, but it is not nearly so large as the stigma of *P. Heimerli*. The above, however, are very small points of difference; but, seeing that the leaves and fruit of *A. spinosus* are quite unknown, I am not prepared to say more than that *Amphoranthus spinosus* = *Phæoptilum spinosum* Radlk. var. ?, as it may possibly prove a distinct species.

Thus my surmise—in the event unfortunate, though arrived at after careful review of all supposed possibilities—that the fruit of *Amphoranthus* would prove a legume, has not been borne out, for the agreements in floral structure between the plants in question are too close to encourage any hope of an essential difference in their fruit.

I may add that one of the flowers of Een's plant has two carpels, united below it is true, but separate above, and each provided with a normal style and stigma. There is, however, but one ovule in the ovary. Radlkofer noted the same thing as of very rare occurrence in *P. spinosum*.

(To be continued.)

ALTHÆA HIRSUTA IN SURREY.

By C. E. Salmon, F.L.S.

In September last this plant was discovered in Surrey, upon the chalk-hills near Reigate, by Mr. Wilfrid B. Alexander, of Tunbridge Wells, who kindly took me to its locality.

Before describing in detail its new Surrey station, it may be well to enumerate its previous records in England, and note the conditions as to habitat and surroundings.

Kent.—In this county the plant was first discovered in 1792 by J. Rayer, who found it in a cultivated field near Cobham,* in West Kent. In this locality it appears to have held its own from this date until the present time. In 1895 my brother and I met with it growing in the same spot, not very plentifully, certainly, but the Rev. E. S. Marshall (*Flora of Kent*) reports that it varies in quantity, like so many annuals, from year to year. It grew on the rough ground one so often finds in and on the borders of fields that are let go out of cultivation on the chalk downs, and was associated with many of the usual plants of that formation, such as *Echium vulgare*, *Origanum*, *Ajuga Chamæpitys*, &c. We could see no obviously introduced plants near, but *Salvia pratensis* was in abundance not very far away.

A. hirsuta has also been reported from other Kent stations—(1) "Embankment near Chislehurst Station, but soon disappeared" (Fl. Kent, *l. c.*). (2) A weed in the garden of a house at West Wickham, in 1883 (A. Bennett). (3) There is a specimen from Wouldham from Dr. Forbes Young's herbarium (who received it from the Botanical Society of London) in the British Museum. Wouldham is about two or three miles from the Cobham locality, but upon the opposite bank of the Medway, and thus in East Kent. The label with the specimen in the British Museum gives no description of the habitat; it appears, however, that the chalk formation occurs there, so it is possible that *A. hirsuta* may grow there under similar conditions as at Cobham.

Somerset (N.).—Mr. J. G. Baker recorded the plant in this Journal for 1875 (p. 358) as occurring "near the woodman's cottage in Butleigh woods, and border of the first cornfield along the path from Butleigh woods to Hurcot." Here he considered it native, and the Rev. R. P. Murray (Fl. Somerset, 62) confirms this view. This record would seem to indicate a habitat somewhat similar to that in which the plant occurs in Kent, excepting that, besides borders of fields, it grows in Somerset, Mr. E. G. Baker tells me, in open spaces in woods.

Mr. J. W. White tells me that in 1894 *A. hirsuta* came up spontaneously in the garden of Sir E. Fry at Failand, about four miles from Bristol, North Somerset—a parallel to Mr. Bennett's West Wickham station. It was considered, at Failand, to have been introduced with manure, and soon died out.

Gloucestershire.—Mr. W. E. Green, of Bristol, records *A. hirsuta* from this county in *Science Gossip*, 1877, p. 187. He describes the plant accurately, and reports it as springing up round the stump of a beech-tree that had been felled on Pur Down, towards Stapleton, on the south side of the Down. It is perhaps extinct now in this locality, as Mr. J. W. White has been unable to detect it recently in that neighbourhood, although he tells me that Mr. E. Wheeler has a specimen in his herbarium, gathered about 1880–2 from "near Pur Down."

Hertfordshire.—In Pryor's *Flora of Herts* (1887) three localities

* Symons, *Synopsis*, 200.

are given—(1) a disused brick-field in the parish of Stanstead Abbot, Ware, growing with *Alyssum incanum*, *Saponaria Vaccaria*, and other casuals; (2) Easneye; (3) "On what used to be Thrift Wood."

Besides the counties enumerated above, *A. hirsuta* has been reported from the following localities as introduced with grain, and in each case was probably a mere casual, and soon died out:—Thames side near Wandsworth and Battersea, Surrey, undoubtedly introduced (Brewer, Fl. Surrey, 315); Cardiff, Glamorganshire, "East Moors" (Storrie, Fl. Cardiff, 24); and Silloth, Cumberland (Hodgson's Flora, p. 63).

If we sift from all these reported stations for *A. hirsuta* those localities in which it is obviously merely a grain introduction, we are left with the, at any rate, native-*looking* stations in Kent, Surrey, and Somerset; its locality in Gloucestershire and some of its Herts stations *may* perhaps fall into this latter class also.

In the lately discovered Surrey locality it occurs in two or three patches, not close together, in a rough chalky field (amongst rather wooded country), such as is frequent on many of the chalk hills of England; the plants were fruiting well, and I saw many young seedlings springing up around the parent plants. In all probability the field had many years back been in cultivation, but so long ago that now it is almost similar in aspect to many of the untouched portions of the downs; and the following plants were noted growing there:—*Viola hirta*, *Fragaria vesca*, *Hypericum perforatum*, *Geranium columbinum*, *Pastinaca sativa*, *Sherardia*, *Inula Conyza*, *Senecio Jacobæa*, *Erythræa Centaurium*, *Echium vulgare*, *Anagallis arvensis* and *cærulea*, *Linaria Elatine* and *riscida*, *Origanum*, *Calamintha Clinopodium* and *Acinos*, and *Ajuga chamæpitys*. The spot is far from houses (which should be mentioned in view of the West Wickham and Failand records, although one looks in vain for the plant in seed catalogues of nurserymen), and we could see no introduced plant or casual.

It is very nearly an exact reproduction, as far as my memory serves, of the spot in which *A. hirsuta* grows at Cobham, and it may perhaps be worth mentioning here, as a strange coincidence, that a single plant of *Salvia pratensis* grows upon the untouched downland of Surrey, about two miles from the *Althæa* field. About ten years ago my brother and I came across this solitary example, but it rarely flowers, and has the appearance of gradual death from old age.

Mr. S. T. Dunn has very kindly furnished me with his notes upon *A. hirsuta*, collected for a work upon British alien plants now in preparation. He says:—"Though a conspicuous plant, *A. hirsuta* was not recorded in Britain until 1792, and this causes it to be suspected as a recent introduction; this suspicion is strengthened when it is seen that so many of its British records are directly connected with 'grain-sifting' aliens. This at once suggests the origin of the Somerset station, and, indeed, all scattered localities for the plant are likely to be due to the dispersal of grain-siftings as food for fowls. As regards the Continental distribution, there is a marked increase in its dependence on man and its scarcity, as the

N.W. of Europe is approached. Thus in Belgium, N. France, and Germany its habitat is cultivated fields and roadsides; while in Southern Europe and the East it grows in waste stony ground and grassy places. Thus its absence in early times in Britain may be inferred from the absence of records, and from its foreign distribution, while there seems abundant evidence of its being a naturalized introduction."

On a detailed account of the new Surrey locality being given to Mr. Dunn, he added:—"The plant has a wide range in Europe, in similar situations to the Reigate one, *i. e.* in ground periodically disturbed, and it is doubtful whether any of its recorded habitats are really wild (*sensu stricto*). It may therefore be one of those species which are native somewhere in the centre of their range, and anciently and widely spread from there to places where the ground is occasionally broken for them by man. If it is native in Britain, it may be discovered in some 'unsuspected' situation, but at present it should probably be classed as a naturalization."

I have not sufficient knowledge of the Continental localities for *A. hirsuta*, nor an exact description of the kind of situations it frequents in the East, to comment upon the opinions Mr. Dunn has expressed; but I trust that botanists who have met with this plant in other countries will furnish us with notes as to habitat, and their opinions as to its status.

As regards Mr. Dunn's remark that "its absence in early times in Britain may be inferred from the absence of records," . . . may I point out that, in glancing through Mr. W. A. Clarke's *First Records*, one finds the following?—*Cephalanthera rubra*, 1797; *Tillæa muscosa*, 1766; *Elatine hexandra*, 1798; *Lobelia urens*, 1778. One would surely hesitate to call these species not native in Britain. Any light thrown upon the question whether *Althæa hirsuta* may be considered a native of Britain will be welcome, as several other British plants—e. g. *Ajuga Chamæpitys* and *Teucrium Botrys*—must be judged with it. Both of these have a similar Continental and British distribution to *A. hirsuta*, and are found in the same situations.

ADDITIONAL WEST LANCASHIRE MOSSES & HEPATICS.

By J. A. Wheldon, F.L.S., and Albert Wilson, F.L.S.

In the short interval that has elapsed since the publication of our last list (Journ. Bot. 1901, 294–299) upwards of forty new species and varieties have been detected, and the desirability of their being duly recorded must be our excuse for so soon presenting another list from this district.

Among the plants enumerated are several additional *Sphagnum* records, which bring the West Lancashire total of these up to thirty out of the forty-one species said to occur in Great Britain. As the varietal forms also occur in almost similar proportion, probably no district of similar area is very much richer in these plants.

We are greatly indebted to Mr. E. C. Horrell for much help with this genus, and no species has been recorded that has not been submitted to him. For help in other directions we have again to express our obligation to Messrs. J. E. Bagnall, H. N. Dixon, S. M. Macvicar, and F. Renauld.

Mr. H. Beesley, of Preston, has kindly placed many notes and specimens at our disposal, and we have inserted below those which are new or rare in the vice-county.

The figures preceding localities indicate the three primary topographical divisions of the vice-county to be adopted in our Flora of the district, and are defined in this Journal for 1899, p. 465. An asterisk is used to signify a plant not included in our previous lists, and, inferentially, a new vice-comital record. Authorities for plant stations are thus contracted—H. B. (Beesley), Wi. (Wilson), and Wh. (Wheldon). The authors jointly are responsible for all records for which no authority is quoted.

Sphagnum quinquefarium Warnst. *var. *fusco-flavum* Warnst. 1. Greygarth Fell, June, 1901. — *Var. *roseum* Warnst. 1. Greygarth Fell, June, 1901.—*Var. *pallescens* Warnst. Leck Fell.—*S. subnitens* R. & W. var. *virescens* Warnst. 2. Clougha Scar; B. & Wh.—*S. rubellum* Wils. *var. *flavum* C. Jens. 3. Cockerham Moss, June, 1900.—**S. fuscum* Klinggr. var. *fuscescens* Klinggr. 3. Cockerham Moss, June, 1900. — *Var. *pallescens* Warnst. 3. Cockerham Moss, 1902; D. A. Jones & Wh.—*S. Russowii* Warnst. *var. *rhodochroum* Russ. 2. Tatham Beck, Hindburn, Sept. 1899; Wi. Grizedale, near Abbeystead. Dale Gill, Hindburn, Sept. 1902.—*S. Warnstorffii* Russ. *var. *viride* Russ. 1. Bog near Docker, Aug. 1902; Wi.—**S. riparium* Angstr. 3. Cockerham Moss, July, 1901; H. B., Wi., and Wh. This fine plant had not been cleared up satisfactorily as a British species when Mr. Horrell's "European Sphagnaceæ" was published. Mr. Horrell informs us that the No. 49, *S. intermedium* var. *riparium* Lindb. of Braithw., Sphag. Brit. Exsicc., is a robust form of *S. recurvum* var. *mucronatum*; so the Oakmere, Cheshire, record for *S. riparium* must go. In addition to the Cockerham Moss locality, this apparently rare plant has been collected in East Cornwall, Mr. Horrell having found a specimen in Curnow's herbarium from "moors near Victoria Station." — *S. pulchrum* Warnst. 2. Grizedale, near Abbeystead. — *S. recurvum* R. & W. var. *amblyphyllum* Warnst. 2. Upper Roeburndale, and in the bog near Docker (1). — **S. Torreyanum* Sulliv. 2. Mallowdale Fell, 21st Sept. 1900.—**S. contortum* Limpr. (=*laricinum* Spruce). 2. Wolfhole Crag; Wi. 1. Very fine and abundant in the bog near Docker. — *S. subsecundum* Limpr. 1. Summit of Greygarth Fell. — **S. Gravetii* Warnst. 2. Tatham Beck, Hindburn, Sept. 1899; Wi. West side of Harris End Fell; Wi. & Wh. Near Fulwood; H. B. — *S. cymbifolium* Limpr. *var. *pallescens* Warnst. 2. Longridge Fell, 1898; Wh. Upper Grizedale and Calder Valley; Wi. Near Damas Gill Head. — *Var. *glauco-pallens* Warnst. 2. Peacock Hill, Longridge Fell, and Blaze Moss above Marshaw.—*Var. *flavo-glaucescens* Russ. 2. Head of Damas Gill. — *Var. *carneum* Warnst. 1. Bog near Docker, June, 1899, and since; Wi.

2. Head of Damas Gill.—*S. medium* Limpr. var. *glauco-purpurascens* Russ. 2. Tatham Moor, Sept. 1902.

Polytrichum gracile Dicks. 3. Rawcliffe Moss; Wi.

Tetraphis Browniana Grev. 2. Harter Beck, Roeburndale; Wi. 1. Falls of the Keer in Wash Dub Wood.

**Diphyscium foliosum* Mohr var. *acutifolium* Lindb. 2. Scars on the north-west side of Wardstone, June, 1902.

Blindia acuta B. & S. 1. Greygarth Fell; Wi.

Dicranella heteromalla Schimp. *var. *interrupta* B. & S. 1. Wall near Leck Hall; Wi.

Dicranum scoparium Hedw. *var. *ericetorum* Corbière. 3. Cockerham Moss, June, 1900; Wi. & Wh. 1. Kellet Seeds; Wi. 2. Clougha, not quite typical; B. & Wh. Longridge Fell; Wh.—*D. Bonjeanii* De Not. *var. *rugifolium* Bosw. 1. Bog near Docker, Nov. 1900; Wi.

Campylopus flexuosus Brid. var. *zonatus* Milde. Clougha; Wh. Gavells Clough, Over Wyresdale.

Fissidens decipiens De Not. 1. Dalton Crag. —**F. osmundioides* Hedw. 2. Near the foot of Gavells Clough, on the white side of Tarnbrook Fell; c. fr. Sept. 1902.

Brachyodus trichodes Fürnr. Damp rocks near the above; c. fr. Sept. 1902.

**Acaulon mediterraneum* Limpr. 3. Muddy bank near Bispham, Feb. 1901; H. B.

Barbula tophacea Mitt. *var. *acutifolia* Schp. 3. Clayey ditch-side between Ovangle and Heaton, Heysham peninsula, April, 1902, with *Pottia Heimii*; Wh.—**B. sinuosa*. 1. With *Trichostomum nitidum* on limestone walls, Silverdale, 1901; Wh.

Weisia verticillata Brid. 1. Wash Dub Wood. 2. Dripping rocks by the Wyre, near Abbeystead; in fruit.

**Zygodon conoideus* H. & T. 1. Trees by the Lune near Kirkby Lonsdale, and near Wash Dub Wood, June, 1901.

**Ulota Drummondii* Brid. 1. Trees by the River Keer in Wash Dub Wood, with *U. Bruchii*, June, 1901.

Orthotrichum tenellum Bruch. 1. On an ash-tree near Arkholme; Wi.

Physcomitrium pyriforme Brid. 1. Between Over Kellet and the 'Redwell Inn'; Wh. Roadside near Docker; Wi.

**Philonotis calcarea* Schimp.—2. Springs on Marshaw Fell, June, 1902; also on the white side of Tarnbrook Fell, and in Calder Valley above Oakenclough; in each case with male inflorescence. The occurrence of this species on the gritstone fells is apparently restricted to small patches of boggy ground surrounding springs, where it is associated with other calcicole species, such as *Hypnum commutatum* and *H. falcatum*. It is probable these springs well up from underlying strata somewhat calcareous in character (dark-coloured impervious shales with which the millstone grit is interpolated), and are sufficiently charged with lime to form a suitable habitat for these plants.

**Bryum filiforme* Dicks. 1. On Silurian rocks, Lower Ease Gill, April, 1902; Wi. — *B. alpinum* Huds. 2. Tarnbrook Fell, at

600 ft.; Wi. And at a similarly low altitude on Marshaw Fell, not far from the road through the Trough of Bowland.

**Webera erecta* (Roth) Correns. 2. Tatham Moor, Hindburn, by roadside runnels, abundantly, Sept. 1902; typical *W. annotina* growing by the same roadside.

**Pterogonium gracile* Sw. 1. Holme area below Kirkby Lonsdale Bridge, June, 1901.

**Antitrichia curtipendula* Brid. 1. On a wall in Wash Dub Wood, June, 1901; Wi. & Wh. Also near Leck; Wi.

**Eurhynchium speciosum* Schimp. 3. By the canal, Ashton, near Preston, 26th July, 1901; H. B. — *E. rusciforme* Milde *var. *alopecuroides* Brid. (*teste* H. N. Dixon). Dale Gill, Hindburn, Sept. 1902.

Brachythecium rutabulum B. & S. *var. *densum* Schimp. 1. Woodwell, near Silverdale; Wh. — *B. rivulare* B. & S. *var. *latifolium* Husn. Botton, Hindburn, Oct. 1899. Referred to this variety by Mr. Bagnall, and it agrees well with the description in its broad hardly plicate leaves, with marked decurrent auricles.

Amblystegium filicinum De Not. *var. *gracilescens* Schimp. 2. Rocks by the Hindburn, near mill-houses; Wi.—*A. irriguum* B. & S. 1. On stones in Leighton Beck, near Silverdale; Wi.—*A. fluviatile* B. & S. 1. On stones in the Lune below Kirkby Lonsdale, May, 1901; and in the Leck Beck, Ease Gill; Wi.

Hypnum polygamum Schp. 3. Ribbleton, near Preston; H. B. Hitherto only recorded from the sand-dune tract. — *H. fluitans* (*amphibium*) *var. *setiforme* Ren. 2. In pools on Goodber Common, May, 1902; Wi. This has been confirmed by Mons. Renauld, who regards it as a form of this variety having shorter leaf-points than usual, identical with specimens collected near Halifax by Messrs. Crossland and Needham. These two are the only reported British localities. — *Var. *atlanticum* Ren. 1. Greygarth Fell, at 2000 ft.; Wi. And in numerous other localities. A further study of this variety has shown, as was to be expected, that it has a range of forms analogous to those of the nearly related vars. *Jeanbernati* and *gracile*. Mr. Crossland finds a remarkably elongated form (simulating var. *setiforme* in habit) near Halifax (f. *submersa* Ren. MS.), which should be looked for in West Lancashire. When starved by drought or exposure small states of these three varieties are very difficult to determine, and one or other of them probably constituted the var. *Holleri* of Sanio. In the absence of original specimens it would probably be well for the present to abandon this name altogether. Our specimens, formerly so named, can all be referred to one or other of the three varieties mentioned above, if due regard is paid to the probable effect of situation on the specimens. — **H. vernicosum* Lindb. 1. Bog near Docker, Aug. 1902; Wi. Quite typical, and exactly matching W. Wilson's own specimens of *H. pellucidum*. It shows no approach to the var. *majus* Lindb., which occurs in another part of the same bog.

Hylocomium brevirostre B. & S. 2. Tarnbrook Wood; H. B.

Lepidozia setacea (Web.) *var. *sertularioides* Nees. 3. Cockerham Moss, Aug. 1902; Jones & Wheldon.—*L. cupressina* Sw. 2. Long

Crag, Over Wyresdale. With us this is always associated with *L. Pearsoni*, *Mylia Taylori*, *Bazzania trilobata*, and *Dicranum fuscescens*.

Cephalozia Lammersiana (Hüben). 3. Cockerham Moss; c. perianths.—*C. fluitans* (Nees). 2. Great Clough of Tarnbrook Fell.—*C. lunulæfolia* (Dum.). 3. Cockerham Moss; Wi. & Wh.

Kantia arguta* (Mont. & Nees). 2. Near Quernmore, January, 1900; Wh. Calder Wood, near Garstang.—K. submersa* Arnell. 3. Cockerham Moss, June, 1900; Wi. & Wh. New to Britain.

Scapania uliginosa* (Sw.) Dum. 1. Ireby Fell, June, 1901.—S. irrigua* (Nees) Dum. 2. Barnacre, near Garstang, Nov. 1900. 1. Greygarth Fell; Wi.—**S. compacta* (Roth) Dum. 1. Arkholme Moor, March, 1902; Wi.

Lophocolea cuspidata Limpr. 1. Wall near Leck, with inflorescence; Wi. 2. Heights Wood, barren; hence, strictly speaking, somewhat doubtful; Wh.

Plagiochila spinulosa (Dicks.) 2. Sparingly amongst *Lepidozia cupressina* on Clougha Scar; Wh.

Jungermannia sphærocarpa Hook. 2. Dale Gill, Hindburn. c. perianths, Sept. 1902.—*J. cordifolia* Hook. 2. Great Clough of Tarnbrook Fell, by springs forming the source of the Tarnbrook Wyre; and on Botton Head Fell.—**J. incisa* Schrad. 2. Clougha Pike, 1899; Wh.—*J. Floerkii* W. & M. *var. *Naumanniana* Nees. 2. Covering bare earthy banks in Heights Wood, in large patches, April, 1902; Wh. Strikingly different in habit from our common moorland typical plant, its large flaccid green leaves giving it a marked individuality.

**Pellia Neesiana* (Gottsche). 2. Whiteray Gill, Hindburn, Feb. 1900; Wi. 1. Greygarth Fell, at 1890 ft.

Blasia pusilla (L.). 2. Grizedale, near Abbeystead; and near Ivah, Hindburn.

Reboulia hemisphærica (L.). 1. Middlebarrow, and on Leck Fell; Wi.

**Lunularia cruciata* (L.). 1. Between Halton and Slyne, May, 1902; Wh.

Chomiocarpon quadratus Scop. 2. Gavells Clough, and rocks by the Wyre above Dolphinholme. 1. By the Keer in Wash Dub Wood.

SHROPSHIRE SPHAGNA.

By W. P. Hamilton.

Numerous British botanists having adopted Dr. Warnstorf's arrangement of the *Sphagna*, it has been thought well to publish a list of the Shropshire species in accordance with that system, so far as they are known up to the present.

Mr. E. C. Horrell, to whom we are indebted for a transcription into English of Warnstorf's "European *Sphagnaceæ*," has kindly looked at a large number of specimens, verifying, correcting, or

naming them as required. Some records are taken from Mr. Horrell's book; the writer is responsible for others, and a few have been named from the synonymy where the cases seemed to admit of it.

It cannot be regarded as quite certain that the above system will be ultimately accepted by all the leading British bryologists—at any rate without some modifications. So far as it proceeds upon definite characters—*e. g.* the shape, position, and size of the chlorophyllose cells, and the form and distribution of the pores in the walls of the hyaline cells—it works fairly well. In the latter respect, however, it leads to the grouping together of numerous forms hitherto kept distinct; for example, under *S. rufescens* Warnst. (Horrell's *Sphagnaceæ*, p. 67) are found "*S. subsecundum* varr. *contortum*, *squarrosulum*, *auriculatum* et *laxum* Auct. pro parte."

The characters imputed to *S. acutifolium* and to *S. subnitens* do not seem to be restricted to specimens of either form respectively, and perhaps both will at some time be reunited under *S. acutifolium*.

When we come to varieties the difficulties are greater. The two forms of *S. recurvum* are distinguished by the shape and size of the stem-leaves, but stem-leaves of both kinds can be found not seldom on one plant. In *S. cymbifolium* justice can only be done by literal quotation—*e. g.* (*op. cit.* pp. 77, 78), "Var. *flavo-glaucescens*. More or less yellowish in the capitulum, at times mixed with some blue-green, whitish below." "Var. *glauco-pallens*. The capitulum white to pale yellowish, at times blue-green, whitish below." Everyone knows how a large tussock of *Sphagnum* shades off into different tints; and opinions will differ as to the value of such distinctions (of which there are other examples) in practical scientific botany.

Several of the following records occur in Mr. R. de G. Benson's list published in this Journal for Sept. 1893. The numerals refer to the botanical divisions of the county adopted by the Caradoc and Severn Valley Field Club.

Sphagnum fimbriatum Wils. 13. Limekiln Woods; old pit-mounds, Lawley, *Painter*. — Var. *tenue* Grav. 7. Whixall Moss, *Benson*.

S. rubellum Wils. vars. *purpurascens* Warnst. and *versicolor* Russ. 4. Shomere Moss, *Hamilton*. 5. Stapeley Hill, *Benson & Hamilton*. 7. Whixall Moss, *Ley*. 8. Wilderley Green, *Benson*. 9. Longmynd, *Benson*; Stapeley Hill, *Benson & Hamilton*.

S. subnitens R. & W. var. *versicolor* Warnst. 4. Bomer Pool and Shomere Pool, *Hamilton*. 5. Stapeley Hill, *Benson & Hamilton*. 7. Whixall Moss, *Benson*, *Armitage* (*Miss*).—Var. *flavescens* Warnst. 7. Whixall Moss, *Ley*; Crosemere, *Wilcox*. 8. Wilderley, *Benson*; Longmynd, *Hamilton*.—Var. *flavo-rubellum* Warnst. 8. Longmynd, *Painter*. 9. Longmynd, *Benson*; Church Stretton, *Weyman*.—Var. *versicolor* Warnst. 9. Shelve Hill, *Benson & Hamilton*. — Var. *violascens* Warnst. 10. Titterstone Clee Hill, *Weyman*. "*S. acutifolium*, near the river, Ludlow," *F. Westcott*, 1848. 11. Wrekin, *Hamilton*. — Vars. *versicolor* Warnst. and *virescens* Warnst. 11. Lawley, *Painter*. 12. Kinlet and Wyre Forest, *Duncan*. — Var. *virescens* Warnst. 13. Cox Wood, *Hamilton*.

S. squarrosum Pers. 8. Pulverbatch, *Benson*. — Var. *spectabile* Russ. 8. Wilderley, *Benson & Hamilton*. 9. Longmynd, *Benson*.

S. teres Angstr. var. *subsquarrosum* Warnst. 4. Stiperstones, *Benson*. 8. Wilderley, *Benson*. — Vars. *subsquarrosum* and *imbricatum* Warnst. 11. Lawley, *Painter*.

S. cuspidatum Russ. & Warnst. var. *plumosum* N. & H. 1. Welshampton Moss, *Hamilton*. 7. Whixall Moss, *Benson*, *Armitage*.— Var. *submersum* Schimp. *Hamilton*, *Ley*. — Var. *plumosum* N. & H. *Benson*.—Var. *falcatum* Russ. *Hamilton*.

S. trinitense C. Müll. (and forms). 7. Whixall Moss, *Hamilton*.

S. pulchrum Warnst. 7. "Whitchurch" (probably Whixall Moss), *Boswell*; Whixall Moss, *Ley*. 8. Wilderley, *Benson*.

S. Torreyanum Sull. 7. "Near Whitchurch" (probably Whixall Moss), *Boswell*.

S. recurvum Russ. & Warnst. 4. Stiperstones, *Benson*. — Vars. *amblyphyllum* Warnst. and *mucronatum* Warnst. 4. Shomere; Weeping Cross, *Hamilton*. 7. Whixall Moss, *Benson & Hamilton*. 8. Pulverbatch, *Benson*. — Var. *mucronatum*. 8. Wilderley Green, *Benson & Hamilton*; Benthall, *Allen*.—Both vars. 9. Shelve Hill, *Benson & Hamilton*. 10. Brown Clee Hill, *Weyman*; Longmynd, *Benson*.— Var. *amblyphyllum*. 12. Linley, *Painter*.

S. molluscum Bruch. 7. Whixall Moss, *Armitage*. 10. Titterstone Clee Hill, *Weyman*.

S. compactum DC. vars. *subsquarrosum* Warnst. and *imbricatum* Warnst. 9. Stapeley Hill, *Benson & Hamilton*.

S. contortum Limpr. 4. Betton Pool, *Hamilton*. 8. All Stretton, *Hamilton*.

S. inundatum Warnst. 4. Shomere, *Hamilton*; Stiperstones, *Benson*. 5. Stapeley Hill, *Benson & Hamilton*. 8. Church Stretton; Caradoc; Wilderley Green, *Benson & Hamilton*. 9. Shelve Hill; Stapeley Hill, *Benson & Hamilton*; Longmynd, *Benson*; near Wentnor, *Painter*. 12. Wyre Forest, *Hamilton*.

S. Gravetii Warnst. 7. Haughmond Hill, *Hamilton*. 8. Church Stretton, *Hamilton*.

S. rufescens Warnst. 8. Church Stretton, *Hamilton*. 9. Shelve Hill, *Benson & Hamilton*. 10. Brown Clee and Titterstone Clee Hills, *Weyman & Hamilton*. 12. Linley, *Painter*.

S. crassicladum Warnst. 4. Bomere, *Hamilton*.

S. obesum Warnst. 9. Ratlinghope, *Benson*.

(*S. imbricatum* Hornsch. 7. In peat, Whixall Moss. Not known there now, *Hamilton*.)

S. cymbifolium Warnst. 1. Welshampton Moss, *Hamilton*. 4. Bomere; Shomere; Weeping Cross, *Hamilton*; Lythwood, *Benson*. —Var. *carneum* Warnst. 4. Bomere, *Hamilton*. 7. Whixall Moss, *Hamilton*. — Var. *glaucescens* Warnst. and forma *squarrosula*. 7. Haughmond Hill, *Hamilton*. — Var. *glaucescens*. 8. Church Stretton; Pulverbatch; Wilderley, *Benson*, *Hamilton*, & *Painter*.— f. *squarrosula*. Wilderley, *Benson*.—"*S. obtusifolium*. 10. Near the river, Ludlow," *F. Westcott*, 1842. 11. The Wrekin, *Hamilton*.— Var. *glaucescens*. 12. Caughley Wood, *Painter & Hamilton*; Linley, *Painter*; Wyre Forest, *Duncan*. 13. Steeraway; The Arcoll, *Painter*.

S. papillosum Lindb. var. *sublæve* Limpr. 1. Welshampton Moss, *Hamilton*.—Vars. *normale* Warnst. and *sublæve* Limpr. 4. Shomere, *Hamilton*. — Both vars. 7. Whixall Moss, *Hamilton*, *Ley*. — Var. *normale*, f. *conferta* W. *Hamilton*.—Var. *normale*. 8. Pulverbatch, *Benson*; Church Stretton, *Hamilton*. — Both vars. 8. Wilderley Green, *Benson & Hamilton*. — Var. *normale*. Shelve Hill, *Benson & Hamilton*.

BIBLIOGRAPHICAL NOTES.

XXIX.—John Bellenden Ker's Botanical Papers.

The enumeration of Ker's papers in the Royal Society's *Catalogue of Scientific Papers* is curiously unsatisfactory. One is entirely omitted; five are enumerated as by another author; and there is no indication that the "Gawler" of an earlier period was identical with Ker: so that out of ten papers of which he was the author only three stand under his name. I have thought it might be worth while to enumerate these in chronological order, and to add a few notes which bear upon the specimens, drawings, and MSS. in the National Herbarium, which were largely employed by Ker in the preparation of his papers, and are constantly referred to in his descriptions in the *Botanical Magazine*. I have not included the unsigned reviews in the *Annals of Botany*, most of which are evidently by Ker.

1. "Ensatarum Ordo. Autore John Bellenden Gawler, Armigero." Ann. Bot. i. 219–247 (1804).*

2. "A Systematic View of the Plants contained in the 'Liliacées par J. P. Redouté.'" Journal of Science and the Arts, i. 168–185 (1816).

This paper is not included in the Royal Society's Catalogue of Scientific Papers. It is cited by Jackson, but not exhaustively; e. g. *Anomatheca xanthospila* (p. 171) stands in *Index Kewensis* as "ex Spreng. Syst. i. 154" (1825); *Anthericum pomeridianum* (p. 181) is cited from "Bot. Reg. t. 564" (1821), where, however, reference is made to its previous publication in Journ. Sci. & Arts. It may be noted that Ker's proposed identification with this of a Cape specimen named *Anthericum scabrum* in Herb. Banks. cannot be accepted. Pallas's Herbarium, to which Ker refers, is now in the National Herbarium, for which it was purchased for the very moderate sum of £49 at the sale of Lambert's collections in 1842.

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* It may be worth while to give the dates of the *Annals*, which was issued in parts at irregular intervals:—

Vol. I.

No. 1.	pp. 1–192	1 May, 1804.
No. 2.	pp. 193–408	1 Sept. 1804.
No. 3.	pp. 409–592	1 Jan. 1805.

Vol. II.

No. 1.	pp. 1–208	1 June, 1805.
No. 2.	pp. 209–392	1 Oct. 1805.
No. 3.	pp. 393–600	1 Sept. 1806.

3. "A Review of the Genus Amaryllis." Journ. Sci. Arts, ii. 342–371 (1817).

AMARYLLIS CHLOROLEUCA Ker, p. 347 (also called on the same page *ochroleuca*). "Nobis tantum ex tabula Domini Francisci Bauer in Museo Banksiano, ad plantam vivam Horto Kewensi floridam adumbrata nota." Ker, *l. c.* This plant seems to have been entirely lost sight of by recent authors—there is no reference to it in Mr. Baker's monograph—and it may be well to call attention to it. In *Index Kewensis* it is referred to *Zephyranthes chloroleuca* Herb. *Appendix* 36 [1821], and this is so far correct; but in his *Amaryllidaceæ* (1837) Herbert places it doubtfully under his *Habranthus chilensis* and describes Bauer's drawing (which he reproduces in part on tab. 45, fig. 6) at length, adding that "it is decidedly not a *Zephyranthes*." Ker reproduces Bauer's drawing (which, although unfinished, is very beautiful) in outline on Tab. viii. *l. c.*; his description of it is full and accurate. I find no reference to it in the Solander MSS., and Herbert says "no memorandum exists at Kew concerning the plant"; its native country is not known.

4. "On the Genus Crinum." Journ. Sci. Arts, iii. 102–115 (1817).

In this paper are first published with descriptions a number of species the names of which appeared three years previously in the *Hortus Bengalensis*. Mr. Jackson (in *Index Kewensis*) has overlooked these, and refers to the second edition of Roxburgh's *Flora Indica* for the descriptions. It may be well to give a corrected list of them; I follow Mr. Jackson's indication as to synonyms (these being printed in italic), as I have not myself gone into the matter:

CRINUM

amoenum Roxb. Hort. Bengal. 23 (nomen), and ex J. B. Ker in Journ. Sci. Arts, iii. 106 (1817).

angustum Roxb. ll. cc. 23, 113.
brevifolium Roxb. ll. cc. 23, 112.
canaliculatum Roxb. ll. cc. 23, 112.
ensifolium Roxb. ll. cc. 23, 106.
longifolium Roxb. ll. cc. 23, 107.
lorifolium Roxb. ll. cc. 23, 111.
moluccanum Roxb. ll. cc. 23, 109.
sumatranum Roxb. ll. cc. 23, 107.
superbum Roxb. ll. cc. 23, 111.
toxicarium Roxb. ll. cc. 23, 110.

These descriptions are cited from a manuscript copy of Roxburgh's *Flora Indica* in the Banksian collection, referred to by Ker as "Roxburgh corom. inedit. Musæo Banks." This work is not in Roxburgh's hand, but is apparently the copy from which the 1832 edition of the *Flora Indica* was printed; there are certain corrections in Roxburgh's hand which are not adopted in the published work, and were probably made later; the index to the MS. is also by Roxburgh. In a separate volume is an index to the whole of Roxburgh's botanical MSS., in which this copy is referred to as "the full flora." Ker turned the English descriptions into Latin; but I cannot understand why he referred to the MS. as "corom.," as it is not at all confined to Coromandel. In two instances he adds to the reference "cum tab. pict."; these figures I have not been able to trace. The MSS. and drawings referred to by Ker as

in the library of the East India Company are now at Kew. There is also at Kew a MS. copy of the *Flora Indica* annotated by Roxburgh.

5. "On the Genus Pancratium." Journ. Sci. Arts, iii. 316–337 (1817).

In this paper are two species, the descriptions of which, like those of *Crinum*, are cited in *Index Kewensis* from the *Flora Indica:* they should stand as

P. biflorum Roxb. Hort. Bengal. 23 (nomen); and ex J. B. Ker in Journ. Sci. Arts, iii. 331 (1817).
P. longiflorum Roxb. ll. cc. 23, 317.

The citations "ex angl. Roxb." and "ex angl. Roxb. corom. ined. Mus. Banks." refer to the MS. *Flora Indica* already described.

"P. VERECUNDUM Solander in Hort. Kew. i. 412 in editione secundâ omissum." Reference to Solander's MSS. shows that in ed. 2 this was united with *P. maritimum*.

I cannot find in Herb. Banks. the specimen from which the description of *P. verecundum* was drawn up, so that the type—"cult. 1776 by Mrs. [or Miss, according to Dryander's MS.] Theobald"—does not seem to exist. *P. caroliniamum*, also noted by Ker as "in editione secunda omissum," was in that edition combined with *P. maritimum;* the specimen from which Ker's figure is taken is in Herb. Banks.

P. UNDULATUM Ker in Journ. Sci. Arts, iii. 325, non Kunth = P. guianense Gawl. (Ker) Bot. Reg. t. 265 (1818), ex Gawl. *l. c.* There is no information on the sheet beyond "Hort. Kewens.," but Gawler (*l. c.*) says that "the specimen had been obtained from a bulb that flowered several years ago at Kew, and which came out of a vessel captured in the late war, having on board a collection of plants of Cayenne for the Botanic Garden at Paris." *P. undulatum* Ker is not in *Index Kewensis:* the plant is now called *Hymenocallis guianensis* Herb.

6. "Of the three Species of the Natural Order Orchideæ represented in Plate VI." Journ. Sci. Arts, iv. 199–206 (1818).

7.–10. "Select Orchideæ from the Cape of Good Hope." *l. c.* v. 104, 105 (1818); vi. 44–46 (1819); viii. 221, 222 (1820); ix. 310, 311 (1821).

To these papers no author's name is attached, and in R. S. C. iv. 279, they are assigned to Masson. The papers on "Select Orchideæ" seem to have been reprinted in 4to as a separate publication, in which form they stand in the Catalogue of the Kew Library, without any reference to the Journal from which they are taken. An account of them and of the drawings from which the accompanying plates are taken will be found in this Journal for 1884, pp. 144–146.*

It may be worth while to add here a biographical note on Ker

* An error which occurs on p. 147 may here be corrected. The drawing by Brant referred to as *Gethyllis undulata* represents *G. ciliaris*, and the lines which follow, down to "but," should be deleted: *undulata* should also be replaced by *ciliaris* on p. 148.

which appears in Sir Mountstuart Grant Duff's *Notes from a Diary* (i. pp. 191, 193; published 1897) under dates "Cannes, April 29, May 1, 1862":—

"In the evening to Dr. Battersby's, where we met Bellenden-Ker, the once-celebrated conveyancer. He told me that his father had been in the Lifeguards when Louis XVI. was beheaded. The officers were ordered to put on mourning. He, Lord Sempill, and Lord Edward Fitzgerald, refused to do so, and were immediately dismissed the service. Walking through Hammersmith just after this had happened, he saw in a window a green flower with a black heart, *Ixia viridis*. He was struck with its appearance, bought it, and devoted himself to plants for forty years. . . . Mr. Bellenden-Ker was intimate, when a young man, with Sir Joseph Banks, of whom he gave a curious description. He [Banks] spoke no foreign language, but received foreigners all day, his secretary, a Swede of the name of Dryander, interpreting for him."

JAMES BRITTEN.

NOTICES OF BOOKS.

A List, with Descriptive Notes, of all the Species of Hepatics hitherto found in the British Islands. By HENRY WILLIAM LETT, M.A., M.R.I.A. Obtainable from the Author, Aghaderg Glebe, Loughbrickland, co. Down. Pp. 199. Price 7s. 6d. net.

THE above is the name given on the title-page to this latest addition to the literature of our *Hepaticæ*, but on the previous page it is inscribed *British Hepatics*, and on the cover *Hepatics of the British Islands*. Either of the latter would be the more appropriate, as the book is in reality a handbook rather than a list with notes. A work of this kind, giving some account of our present knowledge of the British species, at a price within the reach of everyone, was much required, and our thanks are due to Canon Lett for supplying it.

The general plan of the book follows the excellent arrangement of Dixon's *Handbook of British Mosses*, the description of the species being in large type, with the prominent distinctive points italicised, and the habitat and notes on the species in small type. In the preface the author explains that the language employed is not that usually found in botanical books, but "plain, simple English." He uses the terms "back" and "front" of a plant and other similar expressions, which we do not think are an improvement on those generally employed. The use of these popular terms seems somewhat incongruous when one notices that the millimeter scale—which is, unfortunately, not yet familiar to the generality of British students—is always employed. We may mention here the incorrect use of the terms 2-fid, &c., which are generally given indiscriminately, whether the leaves be emarginate, lobed, or deeply divided.

A short synopsis of the genera is followed by a key and a description of each species under their respective genera, the de-

scriptions being usually sufficient for identification; but there are some inaccuracies which might mislead the student. Among them we have noted the following, where the inflorescence is incorrectly given: *Diplophyllum obtusifolium* is not dioicous, but is paroicous, or occasionally monoicous; *Scapania compacta* is heteroicous; *Marsupella ustulata* is paroicous or synoicous. *Lepidozia reptans* is monoicous; *Jungermannia Lyoni* is dioicous; *J. capitata* is paroicous. Under *J. orcadensis* it is stated that the inflorescence is hitherto unknown; the male plant is not very rare in Scotland, and perianths have been found in Scandinavia. The inflorescence of *Kantia arguta* is not "unknown;" a description will be found in Pearson's *Hepaticæ of the British Isles*, with an illustration of the perigynium. Also the male plant of *J. polita* is frequent in Scotland, and fruit has been found on the Continent. *Cephalozia fluitans* has its inflorescence on short postical, not side branches as stated. The following corrections in the descriptions and notes are necessary. *Frullania germana* has frequently male spikes resembling those of *F. Tamarisci*, although there are nearly always linear spikes on the same plant. *Lejeunea microscopica* can easily be distinguished in the field with a pocket lens. *Scapania resupinata* frequently occurs on wet rocks and banks in various parts. In *Lepidozia trichoclados* fruit is not necessary to distinguish this species from *L. setacea*, female bracts, which are generally present, being sufficient. Also, as pointed out recently in this Journal, the mouth of the perianth of *L. setacea* is wide open *when the plant is in fruit;* otherwise it is closed, as in *L. trichoclados*. *Jungermannia exsecta* frequently, and we would say, most commonly, occurs on rotten wood. *J. polita* has by no means sharply pointed leaf-lobes; the lobes are blunt, this being one of the best distinguishing marks in the field. We cannot agree, either, that it resembles *J. gracilis* in its manner of growth. *J. quadriloba* is not 4–5-lobed in its British form; it is most frequently 3-lobed, with an occasional fourth lobe. *J. saxicola* can hardly be described as "a very remarkable little plant;" it is quite of medium size. *J. atlantica* is not smaller than *J. minuta* as stated. *J. barbata* is most commonly without underleaves, or with them almost obsolete.

The distribution of the species, which is given under Watson's Botanical Provinces, can hardly be considered up to date as regards Great Britain, and the term "extremely rare" is used too frequently. The var. *laxifolia* Dum. of *Scapania resupinata*, and the var. *speciosa* Syn. Hep. of *S. undulata* are elevated to the rank of species. *Herberta straminea* (Dum.) is retained as a species. As a synonym of the last there is given *Schisma Sendtneri* Nees. Whatever Dumortier's plant may have been, it can safely be stated that the *Schisma Sendtneri* of the Continent has not been found in Britain. Some other plants are retained as species which have a very doubtful value.

The arrangement of the genera is peculiar, and seems to follow no particular plan. *Targionia* is placed between *Pellia* and *Coleodonia* (*Petalophyllum*); *Marsupella* is between *Scapania* and *Coleochila* (*Mylia*), being separated from *Acolea* by half the contents of

the book; we should have thought that the day was past when *Anthoceros* would be placed between *Sphærocarpus* and *Marchantia*. We consider it unfortunate that some standard work was not followed in this matter. Regarding the arrangement of the species under the genera, we regret to see *Jamesoniella Carringtoni* replaced under *Mesophylla*. If Spruce's name is not retained, the most natural place for the species would probably be under *Plagiochila*. *Anastrophyllum Donianum* bears the name given in Cooke's *Handbook*, where it is under *Bazzania*, an untenable position we consider. The nomenclature apparently more resembles that of Dumortier's *Hepaticæ Europæ* than of any other. All specific names, including those which commemorate persons, begin with a small initial; and a period is inserted between the name and the authority: *e.g.* "*Plagiochila stableri*. Pearson." We see no reason for these departures from recognized custom; nor do we admire the plan of primarily indexing the specific names, and adding an abbreviation of the genus: *e.g.* "stableri, Pears., *Plag.*" The synonymy requires correction in several instances.

Notwithstanding these criticisms, Canon Lett's book will be very useful to students. It is essentially a working book, and the only one which includes all our species, as several have been found which were too late to be included in Pearson's Monograph.

These are *Aneura incurvata*, *Lejeunea Macvicari*, *Scapania crassiretis*, *Marsupella condensata*, *Jungermannia atlantica*, *J. polita*, *J. quadriloba*, *Kantia suecica*, *Cephalozia pleniceps*. *Aplozia atrovirens* and *Southbya* (*Nardia*) *subelliptica* are retained as species. These are all, so far as the British Isles are concerned, known only from Scotland. *Lepidozia trichoclados*, a recently segregated species, has been found in addition in Wales and Ireland. At the end of the book there is a useful bibliography.

S. M. M.

Conspectus Floræ Græcæ auctore E. de Halacsy. Vol. i. pp. 825 [Ranunculaceæ—Dipsaceæ.] Vol. ii. pp. 612 [Compositæ—Labiatæ.] Lipsiæ: Engelmann. 1900–1902. Crown 8vo.

With the death at Athens, on September 7th, of Theodor von Heldreich, the study of the Flora of the East lost one of its most enthusiastic votaries, and the career of a strenuous worker in the domain of pure science closed full of years and of honours. It is not possible to estimate, at present, the extent of the valuable assistance which the leading naturalist of the regenerated Greece of the nineteenth century afforded to Boissier and to other workers in their investigation of the Flora of South-eastern Europe and Western Asia. Every page of the work under review bears evidence of the incessant labours and the critical judgment of the late Director of the University Garden and Museum of Athens. His monumental undertaking, *Herbarium Græcum Normale*, the fine fruit of his extended travels and prolonged studies, is quoted throughout Dr. von Halácsy's work, and his various memoirs on the Greek Flora are always cited; and it is evident that Heldreich's work forms the broad basis of the present *Conspectus*.

It is nearly a hundred years since the publication of the *Prodromus Fl. Græcæ*, the least satisfactory of Smith's works, and probably (as Boissier also points out) the most scrappy European Flora which has ever been issued. This hiatus makes Dr. von Halácsy's *Conspectus* especially welcome, and a much-needed addition to our Continental Floras. The limits assigned to Greece are sentimental rather than political, and include Epirus, Crete, some Turkish islands, and the "rectification" of the frontier which followed the termination of the ill-advised war of 1897. The author has many qualifications for his task. He has accumulated copious material, has visited the country on several occasions, and has already published many memoirs on its Flora. It is not possible, in a brief notice, to adequately discuss the several merits and points of excellence in a work into which the author has thrown much energy and enthusiasm. Among its salient features are the ample bibliography under each species, and the details of distribution in the nomes, and frequently in the eparchies, of the administrative divisions, both of the species and the varieties. The use of Latin in the clear and terse descriptions is abundantly justified, and the terminology leaves nothing to be desired. It may be regretted, perhaps, that the compiler of the Flora of such an important area did not follow the lead of other workers in similar spheres of systematic investigation, in adopting Engler and Prantl's sequence of orders, and in dropping the pre-evolutionary scheme of classification of a bygone period, now gradually falling into disuse. The juxtaposition of certain orders in the course of development of a really natural system of classification may be unfamiliar, and startling to the ideas of conservative botanists of the old school, to whom the cryptic possibilities of Neo-Lamarckism are a snare if not a delusion; but the progressive methods of the reformers are evidenced in the sequence and limits of families in like manner that the genus and the species exhibit grades in the same series of concentric circles rather than diametrically opposed concepts in the cycle of affinity.

Another point, in which the author has unfortunately followed Boissier, and which is at variance with generally accepted principles of nomenclature, is that in the transfer of a species to another genus, the authority for the original specific name is cited instead of that for the new binomial. This injudicious mode of citation prevails throughout the *Fl. Orientalis*. For example, "*Linaria cymbalaria* L. sp. (*Antirrhinum*)," suggests that Linnæus describes the plant as *Antirrhinum Cymbalaria*, but does not convey the more important piece of information that Miller rightly transferred the plant to *Linaria*, its proper genus. This name, also, serves to draw attention to the general custom followed in recent German floras, in which generic names used specifically are not now written with a capital letter. The former usage of writing generic names used specifically with a capital letter is a relic of the time when the specific name was considered of more importance than the generic, and was intended to represent some outward and visible sign of the constancy and immutability of species. Cabalistic

contractions of unfamiliar authorities may be somewhat puzzling to those persons whose acquaintance with botanical literature does not pretend to be encyclopædic, of which the following are casual specimens:—*z. b. g.*, *Sieb. rem.*, *Duf. val.*, *Urb. mon.*, *Lehm. asp.*, and *Ettl. salv.*; and one may be pardoned for hazarding more than one shot at "Biv. man."

Evenness and uniformity in the descriptive portion is apparent throughout the work. The author's greater knowledge of certain groups is not evidenced in a more detailed treatment, and due proportion is maintained in those orders with which he is less familiar. This unflagging uniformity of method, far from being monotonous, invests it with a style and finish which is sometimes wanting in successive instalments of a protracted work. An occasional variant on terms used to denote the same character is met with, as on the same page where the hosts of different species of *Orobanche* are given either as "plantæ nutrientes" or as "plantæ nutrices." The author, in his mode of description, has preferred the use of the ablative throughout in what Willkomm calls the "forma latini sermonis," and has been careful and critical in his selection of terms for denoting colour and the different kinds of hairs. He never uses the ambiguous and corrupt term of *hirtus*, so frequently met with. From the work before us, the investigation of the flora of the hills and plains of Greece does not seem to offer much scope for the dividing judgement of the students of critical genera. Herein are enumerated only eight species of *Rubus*, 25 species of *Rosa*, and 24 species of *Hieracium*. There are 39 species of *Dianthus* and 77 of *Silene*. The account of *Centaurea*, which includes 71 species, is based on the author's admirable synopsis (in German) of the Greek species in *Bull. Herb. Boiss.* 1898.

There is throughout an absence of critical comment and footnotes; and heights which plants attain are rarely given. The only English collector quoted is Stuart Mill. It is a Flora adapted for the plodding and leisurely worker in the herbarium rather than for the field-botanist and traveller; and it would certainly be for their benefit if the learned author were to compile from it a portable volume, with brief differential descriptions, such as Gremli produced for the use of tourists in Switzerland, for the service of those who in the course of a visit to Greece are not entirely absorbed in the appreciation of its unrivalled art-treasures. Dr. von Halácsy will have the best wishes of all those interested in systematic botany for the speedy progress of his important and well-planned work, and congratulations on that portion of it which is already accomplished.

F. N. Williams.

Irish Plants.

I. "On Types of Distribution in the Irish Flora" (pp. 1–60).
II. "Gleanings in Irish Topographical Botany" (pp. 61–94), by R. Lloyd Praeger, B.A., B.E. *Proceedings of the Royal Irish Academy*, vol. xxiv., Sect. B. Dublin, 1902. University Press.

These papers virtually form a supplement to the author's *Irish*

Topographical Botany; they are distinguished by the ability, industry, and grasp of detail so conspicuous in that book.

The former is divided into two sections: the first dealing with the distribution in Ireland of H. C. Watson's eight types (British, Scottish, Highland, &c.) in *Cybele Britannica;* the second—and more original—with the question of natural geographic plant-groups in the Irish flora. Throughout there is a system of small maps (over sixty), showing at a glance, frequently by differences of shading, the occurrence of types or of selected species. The natural groups or types are as follows:—General, Central, Marginal, Ultonian, Mumonian, Lagenian, and Connacian (*i. e.* those of the four provinces). These are worked out with much care and ingenuity; but it need scarcely be said that a hard-and-fast line cannot always be drawn, so that the results obtained are approximate rather than exact. Under six of the types are ranged thirty-four "aliens of well-marked range." *Cuscuta Trifolii*, included among them, is probably native on the coasts of Kerry and Wexford, where it occurs remote from cultivated land; and *C. Epithymum*—an unlikely species to be introduced anywhere—may have been an error of identification.

The "Gleanings" give details of casual aliens, varieties, hybrids, and other critical forms not dealt with in *Irish Top. Bot.* A few of these deserve special mention. *Nasturtium amphibium* × *sylvestre* has been identified (with some little doubt) by Mr. Arthur Bennett from specimens gathered in Waterford and Leitrim; and *Polygala calcarea* may possibly be claimed as Irish, though the evidence is not at present satisfactory. *Stellaria umbrosa*—new to Ireland—has been lately detected in East Cork. There is a good list of *Euphrasia*-segregates. *Rhinanthus Crista-galli* var. *fallax* must disappear from our lists; Dr. von Sterneck, in his Monograph, states that it is *R. major* × *minor*, and has referred the British plants previously so named to *R. stenophyllus*. *Potamogeton crispus* × *obtusifolius* (*P. Bennettii* Fryer), only known in Britain from Stirlingshire, was found by the author in Armagh. The name *Carex flava* × *fulva* should be dropped; for the hybrid in question (*C. Hornschuchiana* × the *flava-Œderi* group) almost certainly represents *C. fulva* Good. itself. All records up to the spring of this year are included; and Mr. Praeger has again earned the gratitude of British botanists.

E. S. M.

BOOK-NOTES, NEWS, &c.

The concluding part of vol. xlv. of the *Bulletin de la Société Botanique de France* has just (10 Nov.) come to hand. Presumably there is some good reason why this number, the contents of which relate entirely to books and proceedings of or subsequent to 1898, has been so long delayed; but in the interests of accuracy we must once more point out the inconvenience of issuing a title-page with the first number of a volume and bearing its date, when the volume is not completed for more than four years afterwards. In the

present instance, the title-page, bearing date "1898," was issued with the number appearing in January of that year; the same date appears on the front side and back of the paper wrapper now issued for the volume. It may be well to record the actual dates at which the various parts were issued, taken from their wrappers; the last wrapper bears no date :—

Part 1, pp. 1–96	June, 1898.	Parts 6–8, pp. 337–496..	March, 1899
,, 2, pp. 97–144	July, ,,	,, 9, pp. 497–624....	Aug. ,,
,, 3 & 4, pp. 145–208 ..	Sept. ,,	,, 10, pp. 625–688 ..	received
,, 5, pp. 209–336	Oct. ,,		10 Nov. 1902

Any reference to delay naturally suggests the Kew *Bulletin*, which, whatever its merits or demerits in other respects, will always occupy a high place among literary curiosities. The number for "Jan.–March, 1901," which appeared in September of that year but bears the Stationery Office date of December, 1900, announced that the volume for 1900 was "in preparation," and that the publication would be "resumed"; since then only two numbers have appeared, the last being that dated "July–September, 1901," and issued in the latter month. It may be mentioned that during the present year the only issues have been three "appendixes"; the volume to which they belong would appear to have succumbed to this new form of appendicitis, as no portion of it has been issued. In 1892, when there seemed some likelihood that it would be discontinued, the *Times* said: "No reasonable man can doubt that the publication of the *Bulletin* is one of the most useful functions discharged by the Royal Gardens;" we protested at the time at this reflection upon the work of the Gardens, and subsequent events have justified our protest. The claim of the *Bulletin* to be "practically a *continuous* record of Kew work in all its branches," which was put forward at the recent Botanical Commission, can hardly be maintained, in face of these remarkable lapses.

The November number of the *Irish Naturalist* is entirely occupied by a special report of the recent meeting of the British Association at Belfast. It is very comprehensive—indeed, we think it errs on the side of completeness; the pages devoted to "The Humorous Side" suggest Scotland rather than Ireland as the venue of the meeting, but of course the north of Ireland is largely Scottish. We extract the account of the exhibition by Prof. Balfour of forms of *Erica Tetralix* from Connemara, which bears upon a note by the Rev. E. F. Linton, recently reprinted in these columns (p. 363). Mr. Linton's oversight may be excused on the ground that no reference is made to Mr. Macfarlane's paper in the singularly complete *Cybele Hibernica*. We have added in brackets to the account as it stands in the *Irish Naturalist* certain information which makes it more complete; we take this opportunity of pointing out how much more useful papers would be if their authors would take the trouble to give definite references instead of the vague indications which are too often met with. We print the paragraph as it stands, though we think it might have been more clearly expressed.

"Professor Balfour gave an exhibition of forms of *Erica Tetralix*

from Connemara, namely, true *Tetralix*, *E. Mackayi*, and *E. Stuarti*, and referred to the new find of *E. Crawfordi*, at the same time pointing out that a well-known garden form—*T. Lawsoni* [*E. Lawsoniana*]—had, so far as he could discover, no history, and that it probably may be found in Connemara along with the others. He desired to direct the attention of Irish botanists to this last form, and also to controvert the statement of Linton in a recent number [July, 1902] of the *Annals of Scottish Natural History*, where he, unaware, as since has been found out, of the careful account by [Dr. J. Muirhead] Macfarlane in the *Transactions of the Botanical Society of Edinburgh* many years ago [xvii. 63, 1892?], describes as he thinks for the first time the form *Stuarti*, and makes it out to be a hybrid of *mediterranea*. The question of its being a hybrid was discussed by Macfarlane, and by his observations as well as his (Professor Balfour's) own, he is convinced that there is no *mediterranea* blood in *Stuarti*, although, as may be seen in the Botanical Society's *Transactions*, he was disposed at first to look for some relationship with *mediterranea*." We find no indication in Dr. Macfarlane's paper of his supposed disposition to consider *E. Stuarti* related to *E. mediterranea*: he says: "I must conclude that this is a very pronounced type of divergence from *E. Tetralix*, though the points of divergence do not lead to any other British form"; and he does not mention having held any other opinion.

We welcome a fresh instalment of the Flora of China published by the Linnean Society; although it extends only to twenty-five pages, it, with the index, completes the second volume. It contains the completion of the *Salicaceæ* by Mr. I. H. Burkill; the *Coniferæ* by Dr. Masters; and the *Cycadaceæ* by Sir W. T. Thiselton-Dyer. It has been said that the delay in publishing this instalment —the preceding appeared in December, 1899—was due to difficulties attendant on the elaboration of the *Cycadaceæ*, but this can hardly have been the case, as the order occupies little more than two pages, and includes only four well-known species. We are glad to learn that the conclusion of the work is not likely to be long delayed; the present volume has taken thirteen years to produce, and the work began in 1886, so that it cannot present anything like a consistent representation of the Chinese flora at any one period. It is to be regretted that the name of the author of each portion does not appear at the head of the page.

At the meeting of the Manchester Literary and Philosophical Society on Oct. 21st, the President, Mr. Charles Bailey, read a paper "On the Adventitious Vegetation of the Sandhills of St. Anne's-on-the-Sea," confining his remarks to four of the more striking aliens which had established themselves. The first, *Œnothera biennis*, is fully established on many of the sandhills, and is one of the first plants to appear on the sides of newly-formed roads or waste land. It is an American plant which has been established on other parts of the Lancashire coast for the last seventy or eighty years. The second is an annual belonging to Central and Eastern Europe, and to the country between Western Asia and India—*Sisymbrium panonicum*. It is frequent on the sandhills and roadsides, and is a

conspicuous feature on account of the height of three or four feet to which it attains; it is most profuse in its fruits and seeds, and seems likely to become more disseminated—indeed, the area which it occupies at St. Anne's has increased from last year, and it is extending inland. The third alien, *Ambrosia artemisiæfolia*—a rare casual in the few places in England where it has previously been found, chiefly with ballast—is of Canadian or North American origin. Of late years it has been making headway on the Continent, as in Denmark, France, Spain, Switzerland, Brunswick, the Austrian Tyrol, &c.; it has come there with crop-seeds, especially with clover from Canada. Although it is termed annual in the American Floras, it is only the aerial portion of the plant which dies down in the early winter; there is an underground portion, in the form of thread-like stolons, or rhizomes, which lives through the winter. These slender processes spring at right angles from the lower portion of the stem about three or four inches below the surface of the ground, and extend for several feet from the parent plant; every few inches they give off upright shoots which in the following spring rise up through the surface as separate plants, able in their turn to originate similar underground processes. No mature fruits have so far been noticed, and it is assumed that the present areas occupied by the plant in the sandhills are the result of several years' continuous growth. The fourth alien is a form of *Vicia villosa*, and is distributed over all European countries, save our own, this being probably the first record of its occurrence in Britain; there is no reason why it should not prove aboriginal, as it is found in Scandinavia, Denmark, Holland, France, and Spain. No special cause could be assigned in explanation of the occurrence of these four plants in such a place as St. Anne's, as there are no corn-mills or industries likely to lead to the introduction of the seeds of such plants.

The proceedings at the opening meeting of the present session of the Linnean Society on Nov. 6th were popular rather than scientific. The evening was entirely occupied by a "lantern-lecture" by Mr. H. J. Elwes on his journey in Chile in the winter of 1901–02. Specimens of the plants collected were exhibited.

The Geological Survey of Canada has issued from the Government press, Ottawa, part vii., including the Lichens and Hepaticæ, of Mr. John Macoun's *Catalogue of Canadian Plants*.

Bulletin No. 3 of the Department of Agriculture, Victoria, contains an account by D. McAlpine of the black spots of the apple, and directions as to spraying for fungus diseases. The disease called "black spot" is caused by a brown mould, *Fusicladium dendriticum*, which was detected in Australia as far back as 1862. The parasite grows either on the leaf, destroying it and reducing the vitality of the tree, or it attacks the developing fruit, checking its growth, and rendering it unfit for market. The loss to the growers is very considerable; in Tasmania it occasions more loss than all other pests combined. McAlpine is of opinion that the disease is continued from season to season by spores that get entangled in the hairs or scales of the bud. In spring, with favouring conditions, the spores germinate and start the disease afresh. A winter form —a species of *Venturia*—has been identified as a stage of the *Fusi-*

cladium, and McAlpine has recently found it in Australia; but it has been proved that the mould may be propagated from year to year without the intervention of this stage. A short account of *Fusicladium pyrinum*, which occurs on the pear, is also given. Mr. McAlpine made a number of experiments in spraying, and the advantage gained was very remarkable. He states that, if the spray be properly prepared and applied at the proper time—that is, in spring, when the spores germinate—no serious losses are likely to be sustained from the attacks of our more common fungus parasites. The mixture found most efficacious in spraying was Bordeaux, with an addition of a salt, some sulphate or nitrate. The success of the spraying experiments is demonstrated by photographs, and the method of preparing the Bordeaux mixture made clear also by photographs and by figures in the text.—A. L. S.

Charles Codrington Pressick Hobkirk, F.L.S., was born at Huddersfield on January 13th, 1837. At the age of fifteen he entered the service of the West Riding Union Bank, and after serving for many years as cashier at Huddersfield he became manager of its Dewsbury branch. Afterwards he became manager of the Dewsbury branch of the Huddersfield Banking Company; from this position he retired four years ago, and removed to Horsforth and afterwards to Ilkley, where he died on July 29 last. He was a man of great geniality and a wide range of interests, and was very popular in the West Riding. He was one of the founders and most active members of the Huddersfield Literary and Scientific Society, and an active member and one of the Presidents of the Yorkshire Naturalists' Union. Nearly forty years ago he published a *History of Huddersfield*, of which at the time of his death he was engaged in preparing a third edition. In 1864, in conjunction with his friend Mr. G. T. Porritt, the entomologist, he established the *Naturalist*, which afterwards became the organ of the Yorkshire Naturalists' Union and with which Hobkirk was associated until his death. He was best known to botanists by his *Synopsis of British Mosses*, of which the first edition was published in 1873, and the second in 1884. He also edited in 1877, in conjunction with his friend the late Mr. Henry Boswell, the *London Catalogue of British Mosses*. Before he took up mosses he worked at phanerogams; his first published paper on Huddersfield plants appeared in the *Phytologist* for December, 1858, and notes on *Cratægus* and *Rosa* in the *Naturalist* for 1866. Perhaps his most interesting essay—which, curiously enough, is unnoticed both in the *Index Kewensis* and in the Royal Society's *Catalogue of Scientific Papers*—is that "Sur les formes du *Capsella*," which appeared in the *Bulletin* of the Société Royale de Botanique de Belgique in 1879 (viii. 449–458): in this certain forms are proposed as species. Other papers on mosses were published in this Journal for 1876, 1879, and 1880—the last an interesting note on some species from a Scottish "crannog"; and a paper, with plate drawn by himself, on the development of *Osmunda regalis*, in 1882. Hobkirk was elected a Fellow of the Linnean Society in 1878.

Herbert Decimus Geldart, the tenth son of Joseph Geldart, of Norwich, who died at his residence at Thorpe Hamlet, Norwich, on

Sept. 21st, was born at Felthorpe Hall, seven miles north of that town, on July 11th, 1831. When he was about ten years old the family returned to Norwich, and lived in the house in Surrey Street formerly occupied by Sir James Edward Smith. At the age of sixteen his mother gave him a microscope, and thus started an interest which continued until his sight failed in his last illness. When he was nineteen both his parents died, and he left the Surrey Street house. He was for forty years in business in Norwich as a wine merchant, from which he retired in 1891. Except for journeys to Spain and Switzerland, Geldart never left the British Islands; the labels in his herbarium are the records of his summer holidays, beginning with plants collected in Yorkshire in 1846. For several years he was examiner in natural history at the House of Education, Ambleside, and contributed various papers to its *Parents' Review*. Geldart took a great interest in Arctic botany, to which his attention was drawn by his friend Col. Feilden, in conjunction with whom he published various papers on the subject in the Transactions of the Norfolk and Norwich Naturalists' Society, 1894–96, of which body he was thrice President. In the same Transactions he published various papers, mostly on local botany, between 1869 and 1899; he also wrote the article on Norfolk botany for the "Victoria History" of the county, published in 1901. For many years he was one of the chief helpers with the Norfolk and Norwich Library; a catalogue he had completed only two days before the fire which destroyed nearly the whole of the library enabled the committee to obtain the full insurance on 60,000 volumes. He has left his herbarium (which contains many old Norfolk collections) to his daughter, Miss Alice M. Geldart, who is herself a botanist.

Mr. G. C. Druce is anxious to obtain the help of our readers towards the erection of a small monument to George Don in his native town of Forfar. The local Committee of the recent Pharmaceutical Conference at Dundee has contributed £5 towards this object, and the Forfarshire Field Club has promised similar help. Those willing to contribute should communicate with Mr. Druce at 118, High Street, Oxford.

In the January number we propose to begin an interesting account of the plates of *English Botany*, on which Mr. F. Garry has been engaged for a considerable time. This will include the sources of the plates and a transcription of the notes on the original drawings, most of which are in the library of the National Herbarium. The account will be issued as a separately paged supplement, and will be continued monthly until completed. We regret that, owing to a misunderstanding on the part of the printer, no separate copies can be obtained of Dr. Batters's "Catalogue of the British Marine Algæ," which is completed with the present number.

In view of the continued pressure upon our space, we propose to discontinue the section devoted to the "Articles in Journals." Now that we have other and more complete records of publications the need for this has disappeared, and the space hitherto devoted to it may be more profitably occupied.

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CORRIGENDA.

P. 24, l. 8 from bottom, should read "*Camderia* Dumont, Anal. Fam. pl.80 (1829)."
P. 40, l. 19 from top, for "walk" read "work."
P. 48, l. 16 from bottom, for "Braun" read "Brand."
P. 51, l. 23 from top, for "40° 11′" read "54° 41′."
P. 69, top line, for "Leideritzii" read "Lüderitzii."
P. 94, l. 16 from top, for "Mr." read "Mrs."
P. 103, l. 6 from top, dele "the late."
P. 150, l. 24, for "0" read "3" See p. 201.
P. 167, par. 2, omit "Germany is entirely unrepresented."
P. 305, AMPHORANTHUS. See p. 408.
P. 325, l. 5 from top, for "*homo literatus*" read "no *homo literatus*."
P. 388, l. 21 from top, for "Victoria University of Liverpool" read "University College, Liverpool."

P. simulans Harv. Coasts of Cornwall (Mount's Bay, Falmouth, Mount Edgcumbe); Devon (Plymouth, Torbay); Dorset (Swanage, Studland). Scotland: Orkney (Skaill); Bute (Arran, Cumbrae). Ireland (Valentia, Kerry). Channel Islands. Rare.

P. opaca Zan. Coast of Guernsey (Petit Port).

P. nigra Batt. (= *Conferva nigra* Huds. Fl. Angl. p. 481, e spec. auth. in Herb. Brit. Mus.; *P. atro-rubescens* Grev.). Coasts of Cornwall, Devon, Dorset, Hants, Sussex, Kent, Essex, Norfolk, Yorks., Northumberland. Scotland: Berwicks., Haddington, Edinburgh, Fife, Forfar, Kincardine, Aberdeen, Elgin, Orkney, Bute. Ireland: Generally distributed. Channel Islands. Not uncommon. —Var. β *Agardhiana* (Grev.). Not uncommon.

P. obscura J. Ag. Coasts of Cornwall (Pridmouth, Penzance, Mount Edgcumbe), Devon (Ladran Bay, Sidmouth); Dorset (Weymouth). Channel Islands (Jersey, Guernsey). Very rare.

P. nigrescens Grev. var. α *pectinata* J. Ag. et var. β *fucoides* J. Ag. Common almost everywhere on the shores of the British Islands.—Var. γ *senticosa* J. Ag. Coast of Devon. Rather rare. — Var. δ *protensa* J. Ag. (= *P. violacea* Harv. in Hook. Br. Fl. ii. p. 332, non Grev.; *P. purpurascens* Harv. Man. ed. 1, p. 88; *P. atro-purpurea* Moore in Harv. Man. ed. 1, p. 89). Coasts of Devon (Torquay); Sussex (Bognor, Eastbourne); Argyle (Appin); Dublin (Balbriggan); and Belfast Lough. Not uncommon. — Var. ε *affinis* J. Ag. (= *P. affinis* Moore). Coasts of Cornwall (Cawsand Bay); Devon (Torbay); Sussex (Eastbourne); Kent (Ramsgate); Essex (mouth of the R. Deben). Ireland (Carnlough, near Glenarm, and Cushendall, Co. Antrim). Channel Islands. Rather rare.

P. Brodiæi Grev. α *typica* Holm. & Batt. Coasts of Cornwall (Penzance, Falmouth, Torpoint); Devon (Plymouth, Torbay, Sidmouth); Dorset (Weymouth, Swanage); Hants (Isle of Wight); Sussex (Brighton); Kent (Folkestone); Northumberland (Whitley, Alnmouth, Berwick); Isle of Man. Scotland: Haddington (Dunbar); Fife (Elie, Earlsferry); Forfar (Arbroath); Aberdeen (Peterhead); Elgin (Forres); Orkney; Bute (Arran, Cumbrae, and Bute); Ayr (Portincross). South and west coasts of Ireland (Roundstone, Malbay, Bantry). Channel Islands. — Var. β *densa* Holm. & Batt. With the type. Not uncommon.

P. subulifera Harv. Coasts of Devon (Torbay); Dorset (Weymouth); Bute (Lamlash, Arran); Antrim (Belfast, Carrickfergus); Galway (Roundstone Bay). Channel Islands (Jersey, Guernsey). Very rare.—Var. β *Templetoni* Harv. Belfast Bay.

P. fruticulosa Spreng. (= *Rytiphlæa fruticulosa* Harv.). Coasts of Cornwall (Trevone, Mount's Bay, Penzance, Falmouth); Devon (Plymouth, Torbay, Sidmouth); Dorset (Weymouth, Swanage); Hants (Isle of Wight); Cheshire (Hilbre Island); Isles of Man and Anglesea. Scotland: Bute (Isles of Arran and Cumbrae); Ayr (Portincross, Ballantrae). Ireland: Cork (Bantry Bay); Antrim (Portrush); Galway (Roundstone Bay); Clare (Miltown Malbay). Channel Islands. Common on the shores of the south of England, Ireland, and the Channel Islands; rare on those of Scotland and northern England.

Gen. 201. Pterosiphonia Falk.

P. complanata Schm. (= *Rytiphlæa complanata* Harv.). Coasts of Cornwall (St. Minver, Land's End, Falmouth, Whitsand Bay); Devon (Plymouth). Ireland: Cork (Bantry Bay); Clare (Caarush Pt., Miltown Malbay). Very rare.

P. parasitica Schm. (= *Polysiphonia parasitica* Grev.). Coasts of Cornwall (St. Minver, Mount's Bay, Falmouth, Looe); Devon (Plymouth, Torbay); Hants (Isle of Wight); Yorks. (Filey); Durham (Seaham, Roker); Northumberland (Whitley, Alnmouth, Holy Island, Berwick); Isle of Man. Scotland: Haddington (Dunbar, North Berwick); Edinburgh (Newhaven); Fife (Earlsferry); Forfar (Arbroath); Kincardine (Dunottar Castle); Aberdeen (Peterhead); Banff (Macduff); Orkney (Kirkwall, Skaill); Argyle (Loch Fyne); Bute (Arran, Cumbrae); Ayr (Largs, Ardrossan, Portincross, Saltcoats); Wigtown (Loch Ryan). Ireland: Wicklow (Black Castle); Cork (Bantry); Clare (Kilkee). Rather rare.— Var. *β coralloides* (Kütz.). Berwick. — Var. *γ repens* J. Ag. Plymouth, Berwick, Ardrossan. Rare.

P. pennata Schm. (= *Polysiphonia pennata* J. Ag.). Mrs. Gulson is said to have found this species at Exmouth (*vide* Gifford, Mar. Bot. p. 122).

P. thuyoides Schm. (= *Rytiphlæa thuyoides* Harv.). Coasts of Cornwall (Padstow, St. Minver, Trevone, Mount's Bay, Falmouth); Devon (Ilfracombe, Plymouth, Torquay, Sidmouth); Dorset (Portland, Swanage); Hants (Isle of Wight); Suffolk (Felixstowe); Norfolk (Cromer); Northumberland (St. Mary Island); Cheshire (Hilbre Island); Isle of Man. Scotland: Haddington (Dunbar); Bute (Arran); Ayr (Portincross). Ireland: Dublin (Howth, Balbriggan); Antrim (Portrush); west coast generally. Channel Islands (Jersey, Guernsey). Rather rare.

Gen. 202. Brongniartella Bory.

B. byssoides Bory (= *Polysiphonia byssoides* Grev.). Coasts of Cornwall, Devon, Dorset, Hants, Sussex, Kent, Essex (Walton), Suffolk (Felixstowe), Norfolk (Yarmouth, Cromer), Yorks. (Scarborough), Northumberland (Cullercoats, Alnmouth, Berwick), Isles of Man and Anglesea. Scotland: Berwicks., Haddington, Edinburgh, Fife, Forfar, Kincardine, Aberdeen, Moray Firth, Orkney, Argyle, Bute, Ayr. Ireland: Cork (Bantry); Clare (Miltown Malbay). Channel Islands. Common on the southern and eastern shores of England and Ireland; rare in Scotland and the west of Ireland.

Tribe Dasyeæ Schm.

Gen. 203. Dasya Ag.

D. corymbifera Crn. (= *D. venusta* Harv.). Coasts of Dorset (Weymouth, Studland) and the Channel Islands (Jersey, Guernsey). Very rare.

D. arbuscula Ag. Coasts of Cornwall (Scilly Islands, Land's End, Lizard, Falmouth, Padstow, Trevone); Devon (Plymouth, Salcombe, Teignmouth); Dorset (Weymouth); Hants (Isle of

Wight); Yorks. (Scarborough); Northumberland (Cullercoats); Isle of Man. Scotland: Caithness (Wick); Orkney; Bute (Isles of Arran and Cumbrae); Ayrshire. Ireland: Cork (Bantry Bay); Wicklow; Dublin (Killiney, Kingstown); Galway (Roundstone); Clare (Miltown Malbay). Channel Islands. Rare.—Var. *cæspitosa* J. Ag. Padstow.

D. ocellata Harv. Coasts of Cornwall (Trevone, St. Minver, Penzance, Falmouth); Devon (Plymouth, Torquay, Teignmouth, Exmouth, Sidmouth, Ilfracombe); Isle of Man. Ireland: Kerry (Smerwick Harbour); Wicklow (Black Castle); Dublin (Balbriggan). Very local.

D. punicea Menegh. (incl. *D. Cattloviæ* Harv.). Coasts of Dorset (Studland), Sussex (Bognor, Brighton), and the Channel Islands (Jersey). Very rare.

Gen. 204. Heterosiphonia Mont.

H. plumosa Batt. (= *Conferva plumosa* Ellis in Phil. Trans. vol. lvii. p. 424, pl. 18, fig. c (1768); Lightfoot, Fl. Scot. ii. p. 996 (1777); *C. coccinea* Huds. Fl. Angl. ed. 2, p. 603 (1778); *Dasya coccinea* Ag.). Abundant on the shores of England, Ireland, and the Channel Islands; more rare in Scotland.—Var. *β tenuior* Batt. (= *Conferva coccinea β tenuior* Dillw.; *D. coccinea β tenuis* J. Ag.; *D. media* Harv. in Herb. Pollexfen). Coasts of Devonshire (Torbay); Orkney (Kirkwall); Argyle (Upper Loch Fyne); Bute (Isles of Arran and Cumbrae); Cork (Bantry). Dredged in 4–10 fathom-water. Rare.—Var. *γ patens* Batt. (= *D. patens* Grev.; *D. coccinea* var. *squarrosa* Harv.). Coasts of Cornwall (Whitsand Bay); Sussex (Brighton); Yorks. (Scarborough); Argyle (Loch Fyne); Galway (Roundstone). Rare.

Fam. Ceramiaceæ Schm.

Tribe Spermothamnieæ Schm.

Gen. 205. Sphondylothamnion Näg.

S. multifidum Näg. (= *Wrangelia multifida* J. Ag.). Coasts of Cornwall (St. Minver, Mount's Bay, Falmouth, Looe); Devon (Ilfracombe, Plymouth, Torbay, Sidmouth); Dorset (Swanage, Studland); Sussex (Brighton); Isle of Man. Scotland: Bute (Isles of Arran and Cumbrae); Ayr (Ardrossan, Saltcoats). Ireland; Cork (Bantry); Belfast Lough; Clare (Miltown Malbay). Channel Islands. Frequent on the south coast of England and west of Ireland. — Var. *β pilifera* (Ag.). Cornwall (Fowey); Devon (Plymouth, Torquay); Sussex (Brighton). Rare.

Gen. 206. Spermothamnion Aresch.

S. Turneri Aresch. (= *Callithamnion Turneri* Ag.). Coasts of Cornwall, Devon, Dorset, Hants, Sussex, Kent, Essex, Suffolk, Norfolk, Yorks., Durham, Northumberland, Isle of Man. Wales. Scotland: Haddington, Edinburgh, Fife, Forfar, Kincardine, Aberdeen, Orkney, Argyle, Bute, Ayr. Ireland generally. Channel Islands. Common. — Var. *monoica* Schm. (= *Callithamnion Turneri* var. *variabile* J. Ag.; var. *repens* Auct.; *S. roseolum* Pringsh.; *S. her-*

maphroditum Auct.). Cornwall (Trevone); Devon (Sidmouth); Sussex (Brighton); Northumberland (Berwick); Cheshire (Hilbre Island); Anglesea. Scotland: Berwicks. (Burnmouth); Haddington (Dunbar); Argyle (Loch Etive); Bute (Arran, Cumbrae). Not uncommon on the northern shores of England and Scotland. — Var. γ *sphæricum* Batt. (= *Callithamnion sphæricum* J. Ag.; *Rhodochorton intermedium* Batt., non Kjellm.). Coast of Northumberland (Berwick). Rare

S. strictum Ardiss. (= *S. flabellatum* Holm. & Batt. Rev. List, non Born.?). Coasts of Sussex (Bognor); Edinburgh (Joppa); Argyle (Loch Etive). Very rare.

S. barbatum Born. (= *Callithamnion barbatum* Ag.; *Antithamnion barbatum* Holm. & Batt.). Coasts of Cornwall (Penzance); Devon (Ilfracombe, Plymouth); Dorset (Weymouth); Fife (Kincraig, Earlsferry); Argyle (Appin). Very rare. — Var. β *mesocarpum* Batt. (= *Callithamnion mesocarpum* Carm.). Cornwall (Falmouth); Sussex (Brighton); Argyle (Appin); Bute (Cumbrae); Antrim (north side of Belfast Lough). Very rare.

S. irregulare Ardiss. Coast of Dorset (Weymouth). Very rare.

Gen. 207. Trailliella Batt.

T. intricata Batt. (= *Callithamnion intricatum* J. Ag.). Coasts of Cornwall (Falmouth); Devon (Plymouth, Torquay, Sidmouth); Dorset (Weymouth); Hants (Isle of Wight).

Gen. 208. Ptilothamnion Thuret.

P. pluma Thur. (= *Callithamnion pluma* Ag.). Coasts of Cornwall (Pridmouth, Mount's Bay, Looe); Devon (Ilfracombe, Plymouth, Sidmouth); Dorset (Weymouth, Swanage); Sussex (Brighton); Norfolk (Cromer). Scotland: Argyle (Appin). Ireland: Cork (Bantry); Clare (Malbay). Channel Islands. Rather rare.

Tribe Griffithsieæ Schm.

Gen. 209. Griffithsia Ag.

G. corallinoides Batt. (= *Conferva corallinoides* L. Sp. Pl. ii. p. 1166 (1753); *Griffithsia corallina* Ag.). Coasts of Cornwall, Devon, Dorset, Hants, Sussex, Kent, Essex (Dovercourt), Northumberland (Hartley); Isle of Man. Scotland: Edinburgh (Joppa, Newhaven, Leith); Fife (Elie, Earlsferry); Orkney (Kirkwall, &c.); Argyle (Appin, Machrihanish Bay); Bute (Arran, Cumbrae); Ayr (Ardrossan). Ireland: Generally distributed. Channel Islands. Not uncommon.

G. flosculosa Batt. (= *Conferva flosculosa* Ellis in Phil. Trans. vol. lvii. p. 425, pl. 18, fig. E (1768); *C. setacea* Huds. Fl. Angl. ed. 2, p. 599 (1778); *Griffithsia setacea* Ag.). Frequent on almost every part of the British coast.

G. Devoniensis Harv. Coasts of Cornwall (Torpoint, Mount Edgcumbe); Devon (Salcombe, Plymouth). Channel Islands (Jersey, Alderney). Very rare.

G. barbata Ag. Coasts of Dorset (Weymouth, Swanage, Studland); Sussex (Brighton); Kent (Folkestone). Channel Islands (Jersey). Very rare.

Gen. 210. Halurus Kütz.

H. equisetifolius Kütz. (*Griffithsia equisetifolia* Ag.). Coasts of Cornwall, Devon, Dorset, Hants, Sussex, Kent, Suffolk (Felixstowe), Norfolk (Yarmouth), Yorks. (Bridlington, Scarborough), North Wales. S.W. Scotland (Arran, Ayrheads). West Ireland (Bantry, Malbay, Kilkee). Channel Islands. Not uncommon. — Var. *β simplicifilum* J. Ag. (= *Griffithsia simplicifilum* Ag.). Isle of Wight (Freshwater); Norfolk (Yarmouth, Cromer); Wicklow (Ardinairy Point, Black Castle). Very rare.

Tribe Monosporeæ Schm.

Gen. 211. Bornetia Thur.

B. secundiflora Thur. (= *Griffithsia secundiflora* J. Ag.). Coasts of Cornwall (Scilly Islands); Devon (Bovisand, Plymouth, Torquay). Channel Islands. Very rare on the English coast; not uncommon on that of the Channel Islands.

Gen. 212. Monospora Solier.

M. pedicellata Sol. (= *Callithamnion pedicellatum* Ag.). Coasts of Cornwall (St. Minver, Scilly Islands, Mount's Bay, Falmouth, Fowey); Devon (Plymouth, Salcombe, Torquay, Sidmouth); Dorset (Weymouth, Swanage, Studland); Hants (Isle of Wight); Sussex (Brighton); Norfolk (Cromer); Cheshire (Hilbre Island); Anglesea; Carnarvon; Pembroke (Milford Haven). Scotland: Orkney; Bute (Arran and Cumbrae); Ayr (Saltcoats, Ardrossan). Ireland: Kerry (Valentia, Ferriter's Cove); Cork (Bantry); Wicklow; Dublin (Howth); Down (Bangor, Portaferry); Antrim (Belfast); Galway (Roundstone); Clare (Kilkee). Channel Islands. Not uncommon on the south coasts of England and Scotland; common in Ireland and the Channel Islands. — Var. *β comosa* Holm. & Batt. Falmouth, Torquay, Sidmouth, Weymouth, Alderney. Rare.

M. clavata J. Ag. Devon (Sidmouth); Sussex (Brighton). Channel Islands (Alderney). Rare.

Gen. 213. Pleonosporium Näg.

P. Borreri Näg. (= *Callithamnion Borreri* Harv.). Coasts of Somerset (Clevedon, Blue Anchor, Minehead); Cornwall (St. Minver, Land's End, Falmouth, Looe); Devon (Ilfracombe, Plymouth, Torquay, Sidmouth); Dorset (Weymouth, Swanage, Studland); Hants (Isle of Wight); Sussex (Brighton); Suffolk (Felixstowe); Norfolk (Yarmouth); Yorks. (near Hull); Cheshire (Hilbre Island, New Brighton); Isle of Man (Douglas); Glamorgan (Swansea). Scotland: Argyle (Falls of Lora); Orkney. East coast of Ireland: Dublin (Clontarf, Howth). Channel Islands (Guernsey). Rare.— Var. *β fasciculatum* Holm. & Batt (= *Callithamnion fasciculatum* Harv.). Devon (Torquay); Norfolk (Yarmouth). Very rare.

Tribe Callithamnieæ Schm.

Gen. 214. Rhodochorton Näg.

R. Brebneri Batt. Parasitic on the fronds of *Glæosiphonia capillaris*. Rennie Rocks, Plymouth. Very rare.

R. membranaceum Magn. Coasts of Devon (Plymouth, Sidmouth); Sussex (Brighton); Northumberland (Cullercoats, Berwick); Cheshire (Hilbre Island); Isle of Man; Anglesea. Scotland: Berwicks. (Burnmouth); Edinburgh (Joppa); Orkney. Ireland: Waterford (Dungarvan Bay). Not uncommon. — Var. *β macroclada* Rosenv. Plymouth, Berwick. Rare.

R. minutum Rke. Dorset (Weymouth). Very rare.

R. Seiriolanum Harv. Gibs. Coast of Anglesea (Puffin Island). Very rare.

R. pallens Hauck. Coast of Devon (Seaton). Very rare.

R. Rothii Näg. (= *Callithamnion Rothii* Lyngb.). Common on most of the rocky parts of the British coasts.

R. parasiticum Batt. (= *R. sparsum* Kjellm.). Coasts of Northumberlend (Berwick); Berwicks. (Burnmouth); Haddington (Dunbar); Fife (Elie); Forfar (Arbroath); Argyle (Loch Etive); Bute (Cumbrae). Not uncommon.

R. floridulum Näg. (= *Callithamnion floridulum* Ag.). Coasts of Cornwall, Devon, Dorset, Hants, Kent, Essex (Dovercourt), Yorks., Durham, Northumberland, Cheshire (Hilbre Island), Isle of Man, Anglesea. Scotland: Haddington, Edinburgh, Fife, Forfar, Kincardine, Aberdeen, Orkney, Argyle, Bute. Ireland: Antrim, Galway, Clare, Kerry. Channel Islands. Not uncommon.

Gen. 215. Callithamnion Lyngb.

C. tenuissimum Kütz. Coasts of Cornwall (Trevone, the Lizard, Falmouth); Devon (Plymouth); Dorset (Studland); Orkney (Kirkwall); Channel Islands (Jersey). Rare.

C. byssoides Arn. Coasts of Cornwall (Mount's Bay, Falmouth, Whitsand Bay); Devon (Plymouth, Salcombe, Dartmouth); Dorset (Swanage, Studland); Hants (Isle of Wight); Sussex (Brighton); Norfolk (Cromer, Runton); Yorks. (Scarborough); Carnarvon. Scotland: Orkney (Kirkwall); Bute (Arran, Cumbrae). Ireland (Strangford Lough, Portaferry, Cork Harbour, Dublin Bay). Channel Islands. Not uncommon.

C. Rabenhorstii Crn. Dorset (Studland). Rare.

C. polyspermum Ag. (incl. *C. Grevillei* Harv. et *C. scopulorum* Traill). Coasts of Cornwall, Devon, Dorset, Hants, Sussex, Kent, Essex, Norfolk, Yorks., Durham, Northumberland, Cheshire (Hilbre Island), Isle of Man, Anglesea, Carnarvon. Scotland: Berwicks., Haddington, Edinburgh, Fife, Forfar, Kincardine, Aberdeen, Elgin, Orkney, Argyle, Bute, Ayr. Ireland: Cork, Wicklow, Dublin, Down, Antrim, Donegal, Galway, Clare, Kerry. Channel Islands. Common.

C. roseum Harv. Cornwall (Scilly Islands, Mount's Bay, Falmouth, Looe); Devon (Plymouth, Torquay); Dorset (Weymouth, Swanage); Hants (Isle of Wight); Sussex (Brighton); Kent (Folkestone); Essex (Southend); Norfolk (Yarmouth, Cley); Yorks. (Scarborough); Durham (Roker); Northumberland (Berwick); Cheshire (Hilbre Island). Wales (Anglesea, Carnarvon). Scotland: Berwicks. (Burnmouth); Haddington (Dunbar); Edinburgh (Joppa); Fife (Earlsferry); Kincardine (Girdleness); Aberdeen (Peterhead); Orkney (Kirkwall); Bute (Isles of Bute, Arran, and

Cumbrae); Ayr (Ardrossan). Ireland: Generally distributed. Channel Islands. Not uncommon.

C. tripinnatum Ag. Devon (Plymouth, Paignton); Galway (Roundstone). Very rare.

C. Dudresnayi Crn. (= *C. affine* et *C. purpurascens* Harv.). Devon (Plymouth); Northumberland (Berwick); Bute (Isles of Bute and Cumbrae); Edinburgh (Joppa). Rare?

C. Hookeri Ag. (incl. *C. lanosum* et *C. spinosum* Harv.). Coasts of Cornwall (Mount's Bay, Falmouth, Looe, Fowey); Devon (Ilfracombe, Plymouth, Torquay, Sidmouth); Dorset (Weymouth); Hants (Isle of Wight); Sussex (Brighton); Norfolk (Yarmouth); Durham (Roker); Northumberland (Hartley, Bamborough, Alnmouth, Berwick); Cheshire (New Brighton); Isle of Man. Wales (Anglesea). Scotland: Haddington (Dunbar, North Berwick); Edinburgh (Joppa); Fife (Elie, Earlsferry); Forfar (Arbroath); Kincardine (Stonehaven); Orkney (Skaill); Argyle (Loch Etive); Bute (Arran, Cumbrae). Ireland: Cork (Youghal); Wicklow; Dublin (Killiney, Clontarf, Malahide); Belfast Lough; Clare (Kilkee). Channel Islands. Frequent.

C. Brodiæi Harv. Coasts of Cornwall (Mount's Bay, Penzance, Falmouth); Devon (Plymouth, Torbay); Dorset (Studland); Hants (Isle of Wight); Northumberland (Berwick). Scotland: Fife (Earlsferry); Forfar (Arbroath); Kincardine (Stonehaven); Aberdeen (Peterhead, Aberdeen); Elgin (Forres); Bute (Arran, Cumbrae); Ayr (Saltcoats). West coast of Ireland (Kilkee, Miltown Malbay). Rare.

C. fruticulosum J. Ag. Coast of Dorset (Swanage). Very rare.

C. arbuscula Lyngb. Coasts of Hants (Shanklin); Yorks. (Filey); Durham (Seaham); Northumberland (Cullercoats, Whitley, Newbiggen, Alnmouth, Berwick); Isle of Man. Scotland: Haddington (North Berwick, Dunbar); Edinburgh (Joppa); Fife (Elie, Anstruther, St. Andrew's); Forfar (Arbroath); Kincardine (Stonehaven); Aberdeen (Peterhead, Aberdeen); Moray Firth; Caithness (Wick); Orkney (Skaill); Bute (Arran); Ayr (Ballantrae). W. Ireland: Mayo (Ballycastle); Clare (Kilkee); Kerry (Dingle); Cork (Bantry). Channel Islands. Common on the shores of northern England and Scotland, and the west of Ireland.

C. tetragonum Ag. *α genuinum* Hauck. Coasts of Cornwall (St. Minver, Scilly Islands, Mount's Bay, Falmouth, Looe); Devon (Ilfracombe, Plymouth, Torquay, Exmouth); Dorset (Portland, Weymouth, Swanage); Hants (Isle of Wight); Yorks. (Scarborough); Isle of Man. Wales (Anglesea). Scotland: Aberdeen (Peterhead); Orkney (Skaill, &c.); Bute (Isles of Arran and Bute); Ayr (Portincross). Ireland: Dublin (Howth); Antrim (Ballycastle); Galway (Roundstone). Channel Islands. Not uncommon.

—*β brachiatum* J. Ag. (= *Callithamnion brachiatum* Harv.). Cornwall (St. Minver, Falmouth, Whitsand Bay); Devon (Ilfracombe, Wembury); Dorset (Weymouth, Swanage); Sussex (Brighton); Northumberland (Cullercoats); Isle of Man. Scotland: Orkney (Skaill); Argyle (Appin, Machrihanish Bay); Bute (Cumbrae);

Ayr (Saltcoats). West coast of Ireland and Channel Islands. Frequent.

C. tetricum Ag. Coasts of Somerset (Minehead); Cornwall (Scilly, Mount's Bay, Falmouth, Trevone); Devon (Plymouth, Lynmouth, Exmouth, Sidmouth); Dorset (Swanage); Hants (Isle of Wight); Norfolk (Cromer). Wales (Swansea Bay). Ireland: Cork (Youghal); Dublin (Lambay); Clare (Malbay). Channel Islands. Common on the south coast of England, the south-east and west of Ireland, and the Channel Islands.

C. corymbosum Lyngb. (incl. *C. versicolor* Ag.). Coasts of Cornwall, Devon, Dorset, Hants, Sussex, Kent, Essex (Harwich), Northumberland (Berwick), Cheshire (Hilbre Island), Isle of Man. Wales (Anglesea). Scotland: Edinburgh (Joppa); Fife (Earlsferry); Aberdeen (Peterhead); Orkney (Kirkwall); Argyle (Loch Etive); Bute (Cumbrae); Ayr (Ardrossan, Girvan). Ireland: Cork (Bantry); Wicklow; Dublin (Clontarf, Malahide); Down (Bangor); Belfast Lough; Galway (Roundstone); Clare (Kilkee). Channel Islands. Not uncommon.

C. granulatum Ag. (= *Callithamnion spongiosum* Harv.). Coasts of Cornwall (Scilly, Land's End, Falmouth, Pridmouth); Devon (Ilfracombe, Plymouth, Salcombe, Torbay); Dorset (Swanage); Hants (Isle of Wight); Northumberland (Berwick); Isle of Man (Douglas). Wales (Anglesea). Scotland: Haddington (Dunbar); Fife (Largs); Forfar (Arbroath); Orknəy; Bute (Arran, Cumbrae); Ayr (Saltcoats, West Kilbride). Ireland: Wicklow; Dublin (Howth, Kingstown Harbour, Killiney); Antrim (Larne); Clare (Kilkee). Channel Islands. Not uncommon.

Gen. 216. Seirospora Harv.

S. Griffithsiana Harv. (= *Callithamnion seirospermum* Griff.). Coasts of Cornwall (Trevone, Whitsand Bay, Torpoint); Devon (Plymouth, Salcombe, Torbay); Dorset (Weymouth, Swanage, Studland); Sussex (Brighton); Cheshire (Hilbre Island); Isle of Man. Scotland: Aberdeen (Peterhead); Cromarty; Orkney (Kirkwall Bay); Bute (Arran). Ireland: Down (Portaferry); Galway (Roundstone). Rare. — *β miniata* Batt. (= *C. seirospermum* var. *miniatum* Crn.). Dorset (Weymouth, Studland).

S. interrupta Schm. (= *Callithamnion interruptum* Ag.). Coasts of Dorset (Swanage, Studland) and Sussex (Brighton). Very rare.

S. hormocarpa Batt. (= *Callithamnion hormocarpum* Holm.; *C. byssoides* f. *seirosporifera* Holm. & Batt.). Coasts of Cornwall (Torpoint); Devon (Bovisand, Plymouth, Wembury); Dorset (Studland). Very rare.

Tribe Compsothamnieæ Schm.

Gen. 217. Compsothamnion Schm.

C. thuyoides Schm. (= *Callithamnion thuyoides* Ag.). Coasts of Cornwall (St. Minver, Flushing Bay, Falmouth, Land's End, Trebetherick, Fowey); Devon (Plymouth, Ilfracombe, Torquay, Sidmouth); Sussex (Brighton); Norfolk (Yarmouth, Cromer); Isle of Man. Wales (Swansea). Scotland (Orkney). Ireland (Wicklow, Portaferry, Roundstone). Channel Islands (Guernsey). Rare.

C. gracillimum Schm. (= *Callithamnion gracillimum* Harv.). Coasts of Cornwall (Falmouth, Torpoint); Devon (Ilfracombe, Plymouth, Torquay, Exmouth). Wales (Beaumaris, Milford Haven). Scotland: Fife (Kincraig, Earlsferry); Bute (Arran and Cumbrae). Ireland (Black Castle, Wicklow). Rare.

Tribe Ptiloteæ Schm.

Gen. 218. Plumaria Stackh.

P. elegans Schm. (= *Ptilota sericea* Harv.). Common all round the shores of the British Islands.

Gen. 219. Ptilota Ag.

P. plumosa Ag. Coasts of Yorkshire (Scarborough, Filey); Durham (Roker, Sunderland, &c.); Northumberland (Cullercoats, Alnmouth, Holy Island, Berwick); Cheshire (Hilbre Island); Isle of Man (Castletown). Wales (Anglesea). Scotland: Berwicks. (Burnmouth); Haddington (Dunbar, North Berwick); Fife (Elie, Earlsferry); Forfar (Arbroath); Kincardine (Stonehaven); Aberdeen (Peterhead); Elgin (Lossiemouth); Caithness (Wick); Orkney (Kirkwall); Argyle (Loch Etive, Campbeltown); Bute (Cumbrae, Arran); Ayr (Ayrheads). N. & W. Ireland. Very common on the shores of Scotland, northern England, and north and west Ireland. (Obs.—The *P. plumosa* of the old Floras of Cornwall, Devon, Dorset, Hants, Sussex, Kent, and Norfolk must be referred to *Plumaria elegans*, which was formerly regarded as a variety of the present species.)

Tribe Crouanieæ Schm.

Gen. 220. Antithamnion Näg.

A. cruciatum Näg. (= *Callithamnion cruciatum* Ag.). Coasts of Cornwall (Lizard, Looe); Devon (Plymouth, Salcombe, Torquay); Hants (Isle of Wight); Sussex (Brighton); Cheshire (Hilbre Island). Wales (Anglesea, Milford Haven). Scotland: Bute (Arran); Kirkcudbright (Colvend). Ireland: Cork; Ferriter's Cove, Kerry; and coast of Down. Rare. — Var. *β pumilum* (Harv.). Cornwall (Lizard); Dorset (Portland). Ireland (Miltown Malbay). Rare.

A. Plumula Thur. Coasts of Cornwall (Padstow, St. Minver, Mount's Bay, Falmouth, Looe); Devon (Ilfracombe, Plymouth, Salcombe, Torquay, Sidmouth); Hants (Isle of Wight); Sussex (Brighton); Kent (Folkestone); Essex (Estuary of the Orwell); Norfolk (Yarmouth, Cromer); Yorks. (Scarborough); Northumberland (Berwick); Isle of Man. Scotland: Edinburgh (Caroline Park, Joppa); Fife (Elie); Forfar (Dundee, Arbroath); Aberdeen (Peterhead); Orkney (Kirkwall); Bute (Arran, Cumbrae); Ayr (Ardrossan). Ireland: Cork (Bantry); Dublin (Killiney, Clontarf); Antrim (Portrush). Channel Islands. Not uncommon. — Var. *β crispum* J. Ag. Cornwall (St. Minver, Mount's Bay, Falmouth); Devon (Plymouth); Dorset (Weymouth). Channel Islands (Jersey). Rare. — Var. *γ spinescens* Strömf. Northumberland (Berwick).— Var. *δ boreale* Rke. Bute (Arran, Cumbrae); Orkney (Kirkwall). Very rare.

A. floccosum Kleen (= *Callithamnion floccosum* Ag.). Coasts of Fife (Kinghorn); Forfar (Dundee); Kincardine (Cove); Aberdeen (Peterhead, Aberdeen); Orkney (Skaill); Bute (Cumbrae); Ayr (Saltcoats). Very rare.

Gen. 221. Hymenoclonium Batt.

H. serpens Batt. Coast of Devon (Plymouth). Very rare.

Gen. 222. Crouania J. Ag.

C. attenuata J. Ag. Coasts of Cornwall (Mousehole, Penzance, Falmouth); Devon (Plymouth, Salcombe). Channel Islands (Guernsey, Alderney). Very rare.

Tribe Spyridieæ Schm.

Gen. 223. Spyridia Harv.

S. filamentosa Harv. Coasts of Cornwall (Torpoint); Devon (Plymouth, Torquay, Exmouth, Budleigh, Sidmouth); Dorset (Portland, Weymouth); Hants (Isle of Wight, Southampton); Sussex (Brighton). Wales: Holyhead, Beaumaris, Aberfraw. Channel Islands (Jersey). Locally abundant on the south and west coasts of England; unknown on the Scotch and Irish coasts.

Tribe Ceramieæ Lyngb.

Gen. 224. Ceramium Lyngb.

C. gracillimum Harv. Coasts of Cornwall (Penzance); Devon (Plymouth, Torquay); Dorset (Weymouth, Swanage); Sussex (Hastings); Norfolk (Cromer). Ireland (Kilkee). Rare.

C. tenuissimum J. Ag. (= *C. nodosum* Harv.). Coasts of Cornwall (Pridmouth, Falmouth, Looe); Devon (Plymouth, Torquay, Sidmouth); Dorset (Weymouth, Swanage); Hants (Isle of Wight); Sussex (Bognor, Brighton); Essex (Harwich); Norfolk (Cromer); Yorks. (Scarborough); Cheshire (Hilbre Island); Isle of Man. Wales (Anglesea). Scotland: Bute (Arran, Cumbrae); Ayr (Saltcoats, Troon); Orkney (Kirkwall). Ireland: Cork (Bantry); Dublin (Ireland's Eye, Dublin Bay, Howth); Down (Bangor, Newcastle); Donegal (Rathmullen); Galway (Roundstone). Channel Islands. Locally abundant.—Var. *β arachnoideum* Ag. Jersey. Rare.

C. strictum Harv. Coasts of Cornwall (Trevone, Mount's Bay, Penzance, Falmouth, Pridmouth); Devon (Plymouth, Paignton, Torquay); Dorset (Weymouth, Swanage); Northumberland (Berwick); Cheshire (New Brighton, Hilbre Island); Isle of Man. Wales (Anglesea). Scotland: Haddington (Dunbar); Fife (Kincraig, Earlsferry, Elie, Pittenweem); Bute (Arran, Cumbrae). Ireland: Kerry (Dingle); Galway (Roundstone). Channel Islands. Not uncommon.—Var. *β delicatum* J. Ag. Coasts of Cornwall and Devon. Rare.—Var. *γ zostericola* Le Jol. (= *C. divaricatum* Holm. Fasc. no. 29; *C. pellucidum* Crn.). Dorset (Weymouth); Bute (Arran and Cumbrae); Ayr (Fairlie); Galway (Roundstone). Locally abundant.

C. fastigiatum Harv. Coasts of Cornwall (Torpoint, Mount Edgcumbe); Devon (Plymouth, Torbay, Sidmouth); Sussex

(Brighton); Cheshire (Hilbre Island); Isle of Man; Firth of Forth (Joppa). Rare.

C. diaphanum Roth. Coasts of Cornwall, Devon, Dorset, Hants, Sussex, Kent, Essex (Dovercourt), Suffolk (Felixstowe), Norfolk (Cromer), Yorks., Durham, Northumberland. Scotland: Haddington, Fife, Forfar, Kincardine, Aberdeen, Orkney, Argyle, Bute, Ayr. Ireland. Channel Islands. Not uncommon.

C. Deslongchampsii Chauv. Coasts of Somerset (Blue Anchor, Minehead); Cornwall (Torpoint); Devon (Ilfracombe, Plymouth, Torquay); Sussex (Brighton); Essex (Southend, Harwich); Norfolk (Yarmouth); Yorks. (Scarborough); Durham (Sunderland); Northumberland (Cullercoats, Alnmouth, Berwick); Lancs. (Ulverston); Cheshire (New Brighton, Hilbre Island); Isle of Man. Wales (Anglesea, Llandudno, Swansea). Scotland: Haddington, Edinburgh, Fife, Forfar, Kincardine, Aberdeen, Elgin, Orkney, Argyle, Ayr. Ireland (Dublin Bay, Balbriggan, Belfast Lough). Channel Islands. Not uncommon.

C. circinatum J. Ag. (= *C. decurrens* Harv.). Coasts of Cornwall (Trevone, St. Minver, Whitsand Bay); Devon (Plymouth, Torquay); Sussex (Bognor, Brighton); Cheshire (Hilbre Island); Isle of Man. Wales (Anglesea). Scotland: Fife (Largo); Bute (Arran, Cumbrae); Ayr (Ardrossan); Orkney. Ireland (Malahide). Rather rare.

C. arborescens J. Ag. Coasts of Cornwall (Mount Edgcumbe); Devon (Torquay); Argyle (Dunoon); Bute (Cumbrae); Orkney (Kirkwall). Probably not uncommon.

C. fruticulosum Kütz. Coasts of Devon (Torbay); Dorset (Swanage); Northumberland (Berwick). Rare.

C. Crouanianum J. Ag. Coasts of Cornwall (Falmouth) and Devon (Torquay). Rare.

C. vimineum J. Ag. Devon (Falmouth); Dublin (Balbriggan).

C. tenue J. Ag. Coast of Orkney (Kirkwall).

C. botryocarpum Griff. Coasts of Cornwall (St. Minver, Falmouth); Devon (Plymouth, Torquay); Hants (Isle of Wight); Sussex (Brighton); Yorks. (Scarborough); Durham (Seaham); Northumberland (Berwick); Isle of Man. Scotland: Haddington (Dunbar); Edinburgh (Joppa); Fife (Earlsferry); Forfar (Arbroath); Bute (Arran, Cumbrae); Ayr (Saltcoats, Ardrossan). Ireland and Channel Islands. Not uncommon.

C. rubrum Ag. *α pedicellatum* J. Ag. Common almost everywhere on the British coasts.—Vars. *β fasciculatum* J. Ag. et *γ corymbiferum* J. Ag. Not uncommon on the southern coasts of England and Scotland.

C. secundatum J. Ag. Cornwall (Scilly Islands); Orkney (Skaill); Clare (Kilkee). Rare.

C. pennatum Crn. (= *C. Microcladia* Cocks). Cornwall (Pridmouth, Looe, Constantine Bay); Dorset (Weymouth, Studland); Northumberland (Berwick); Bute (Cumbrae). Rare.

? C. Derbesii Kütz. Coasts of Devon and Antrim.

C. flabelligerum. Coasts of Somerset (Blue Anchor, Minehead, Pentire); Cornwall (Trevone, Padstow. St. Minver, Mount's Bay,

Looe); Devon (Plymouth, Torbay); Dorset (Weymouth); Hants (Isle of Wight); Kent (Folkestone, Dover); Essex (Harwich); Suffolk (Felixstowe); Norfolk (Yarmouth); Northumberland (Whitley, Berwick); Cheshire (Puffin Island); Isle of Man; Lancs (Ulverston). Scotland: Edinburgh (Joppa); Bute (Cumbrae); Ayr (Largs); Ailsa Craig. Ireland (coast of Down). Channel Islands. Not common.

C. echionotum J. Ag. Coasts of Somerset (Minehead); Cornwall (St. Minver, Scilly Islands, Mount's Bay, Falmouth, Looe, Mount Edgcumbe); Devon (Plymouth, Torbay); Dorset (Weymouth, Portland, Swanage); Hants (Isle of Wight); Sussex (Brighton); Isle of Man. Wales (Anglesea). Scotland: Orkney; Bute (Cumbrae); Ayr (Saltcoats). Ireland: Antrim (Larne); Galway (Roundstone); Cork (Youghal). Channel Islands. Not uncommon on the south coast of England and the north and west of Ireland. — Var. *β transcurrens* (= *Acanthoceros transcurrens* Kütz.). Devon (Torbay, Sidmouth); Dorset (Studland).

C. ciliatum Ducluz. Coasts of Cornwall (Trevone, St. Minver, Scilly Islands, Mount's Bay, Falmouth, Fowey); Devon (Ilfracombe, Plymouth, Torbay, Exmouth, Sidmouth); Dorset (Weymouth); Hants (Isle of Wight); Sussex (Brighton); Yorks. (Scarborough); Isle of Man. Wales (Anglesea). Scotland: Edinburgh (Caroline Park); Fife (Elie); Forfar (Dundee); Bute (Arran); Ayr (Saltcoats); Orkney (Rinansey). Ireland: Generally distributed. Channel Islands. Rather rare.

C. acanthonotum Carm. Coasts of Somerset, Cornwall, Devon, Dorset, Hants, Norfolk, Yorks., Durham, Northumberland, Cheshire, Isle of Man, Wales, Scotland, Ireland, and Channel Islands. Common on the rocky parts of the British coasts.

Gen. 225. Microcladia Grev.

M. glandulosa Grev. Coasts of Cornwall (Scilly Islands, Mount's Bay, Falmouth, Pridmouth, Mount Edgcumbe); Devon (Plymouth, Brixham, Paignton, Torquay, Teignmouth, Exmouth, Budleigh); Yorks. (Hompton, near Hull); Orkney Islands. Ireland: Wicklow (Bray); Dublin (Kingstown). Channel Islands (Guernsey). Rare.

Series Cryptoneminæ Schm.

Fam. Gloiosiphoniaceæ Schm.

Gen. 226. Gloiosiphonia Carm.

G. capillaris Carm. Coasts of Cornwall (Mount's Bay, Falmouth, St. Maw's, Mount Edgcumbe); Devon (Plymouth, Wembury, Torbay, Teignmouth. Sidmouth); Kent (Sheerness); Yorks. (Scarborough, Filey); Northumberland (Cullercoats, Whitley, Alnmouth, Berwick); Isle of Man. Wales (Anglesea). Scotland: Haddington (Dunbar); Edinburgh (Joppa); Fife (Elie); Forfar (Arbroath); Kincardine (Cove); Aberdeen (Peterhead); Moray Firth; Orkney (Skaill); Argyle (Loch Etive, Appin, Achnacree); Bute (Arran, Cumbrae); Ayr (Largs, Ardrossan). Ireland: Dublin (Howth, Balbriggan); Antrim (Glenarm); Galway (Roundstone); Cork (Bantry). Channel Islands. Widely distributed, but never abundant.

Fam. Grateloupiaceæ Schm.

Gen. 227. Halymenia Ag.

H. latifolia Crn. Blackhead, Co, Antrim. Very rare; only obtained by dredging.

Gen. 228. Grateloupia Ag.

G. filicina Ag. Coasts of Somerset (Minehead); Cornwall (Padstow, St. Minver, Mount's Bay, Falmouth, Whitsand Bay); Devon (Ilfracombe, Lynmouth, Torbay, Exmouth, Sidmouth); Suffolk (Felixstowe). Wales (Aberystwith). Channel Islands (Jersey, Guernsey).—Var. *β intermedia* Holm. & Batt. Devon (Torquay, Exmouth). Channel Islands (Guernsey).

G. dichotoma J. Ag. Coasts of Somerset (Minehead); Cornwall (St. Michael's Mount, St. Minver, Trevone, Falmouth, Fowey, Newquay); Devon (Plymouth). Rare.

G. minima Crn. Coast of Devon (Ilfracombe, Torquay). Rare.

Fam. Dumontiaceæ Schm.

Gen. 229. Dumontia Lamour.

D. incrassata Lam. (= *Ulva incrassata* Müll. Fl. Dan. t. 653 (1775), non Huds. Fl. Angl. ed. 2, p. 572; *U. filiformis* Huds. Fl. Angl. ed. 2, p. 570 (1778); *Dumontia filiformis* Grev.). Coasts of Cornwall, Devon, Dorset, Hants, Essex (Blackwater Estuary); Norfolk (Cromer), Yorks., Durham, Northumberland, Cheshire, Isle of Man, Wales, Scotland, Ireland, and the Channel Islands. Common on most parts of the British coasts. — Var. *β crispata*. Coasts of Devon (Torquay); Northumberland (Budle Bay, Berwick). Scotland (Dunbar, Joppa, Leith, Elie, &c.). Not uncommon.

Gen. 230. Dudresnaya Bonnem.

D. verticillata Le Jol. (= *Ulva verticillata* Velley in Wither. Bot. Arr. ed. 3, vol. iv. p. 127 (1796), e spec. orig. in Herb. Kew.; *D. coccinea* Crn.). Coasts of Cornwall (Falmouth, Fowey, Torpoint); Devon (Plymouth, Wembury, Salcombe, Torquay, Exmouth, Sidmouth); Dorset (Weymouth, Swanage, Studland); Sussex (Brighton). Scotland: Haddington (near Dunbar); Orkney (Kirkwall); Bute (Arran and Cumbrae); Ayr (Saltcoats). Ireland (Bantry). Channel Islands (Jersey, Guernsey). Rare.

Gen. 231. Dilsea Stackh.

D. edulis Stackh. (= *Iridæa edulis* Harv.). Coasts of Cornwall, Devon, Dorset, Hants, Sussex, Kent, Essex, Norfolk, Yorks., Durham, Northumberland, Isle of Man, Wales, Scotland, Ireland, and Channel Islands. Common.

Fam. Nemastomaceæ Schm.

Tribe Schizymenieæ Schm.

Gen. 232. Calosiphonia Crn.

C. vermicularis Schm. (= *C. Finisterræ* Crn.). Coasts of Dorset (Weymouth) and Channel Islands (Jersey). Very rare.

Gen. 233. Schizymenia J. Ag.

S. Dubyi J. Ag. (= *Kallymenia Dubyi* Harv.). Coasts of Cornwall (Scilly Islands, Mount's Bay, Cape Cornwall, Falmouth); Devon (Plymouth). Ireland (Belfast Lough and Glenarm, Co. Antrim). Channel Islands (Guernsey). Very local.

Gen. 234. Platoma Schm.

P. marginifera J. Ag. (= *Nemastoma marginifera* J. Ag.). Coast of Cornwall (Whitsand Bay, Padstow). Very rare.

Tribe Halarachnieæ Schm.

Gen. 235. Halarachnion Schm.

H. ligulatum Kütz. (= *Halymenia ligulata* Ag. *a genuinum* Hauck). Coasts of Cornwall (St. Minver, Mount's Bay, Falmouth, Torpoint); Devon (Ilfracombe, Plymouth, Torquay, Sidmouth); Dorset (Weymouth, Swanage); Hants (Christchurch, Isle of Wight); Sussex (Worthing, Brighton); Suffolk (Corton); Norfolk (Yarmouth, Sheringham); Cheshire (Hilbre Island); Isle of Man. Wales (Anglesea). Scotland: Aberdeen (Peterhead); Banff (Macduff); Orkney (Kirkwall); Argyle (Southend, Kintyre); Bute (Arran and Cumbrae); Ayr (Portincross). Ireland: Cork (Bantry); Clare (Malbay, Kilkee, and south and east coasts). Channel Islands (Jersey, Guernsey). Rare, and mostly confined to the southern shores of England and Ireland.—Var. *β dichotomum* Harv. Padstow, Yarmouth, Jersey. Not uncommon.—Var. *γ latifolium* Harv. Salcombe, Plymouth, Kirkwall, West of Ireland. Rare. — Var. *δ ramantaceum* Harv. Sidmouth, Brighton.—Var. *ε aciculare* Hauck. Sidmouth, Weymouth, Worthing, Jersey, Kirkwall. Rare.

Gen. 236. Furcellaria.

F. fastigiata Lamour. Common almost everywhere on the shores of the British Islands.

Tribe Nemastomeæ Schm.

Gen. 237. Nemastoma J. Ag.

N. Bardii Farlow (= *Helminthocladia Hudsoni* Batt. in Journ. Bot. 1900, p. 377, non J. Ag.). Coast of Northumberland (Cullercoats). Very rare.

Fam. Rhizophyllidaceæ Schm.

Gen. 238. Polyides Ag.

P. rotundus Grev. Common on most parts of the British coasts.

Fam. Squamariaceæ Schm.

Tribe Cruorieæ Schm.

Gen. 239. Rhododiscus.

R. pulcherrimus Crn. Coast of Devon (Plymouth). Very rare; only obtained by dredging.

Gen. 240. Petrocelis J. Ag.

P. cruenta J. Ag. (= *Cruoria pellita* Harv. in Phyc. Br., non Lyngb.). Coasts of Cornwall (St. Minver, Mount's Bay, Falmouth, Fowey, Looe); Devon (Ilfracombe, Torquay); Hants (Isle of Wight); Yorks. (Scarbrough); Northumberland (Berwick); Cheshire (New Brighton, Hilbre Island). Scotland: Berwicks. (Burnmouth); Haddington (Dunbar); Edinburgh (Joppa); Fife (Elie, Earlsferry); Forfar (Arbroath); Argyle (Appin, Oban, Lismore, Loch Goil); Bute (Cumbrae); Renfrew (Gourock). West of Ireland: Clare (Malbay); Channel Islands (Guernsey). Not uncommon).

R. Hennedyi Batt. (= *Actinococcus Hennedyi* Harv.). Coasts of Yorkshire (Filey); Northumberland (Alnmouth, Holy Island, Berwick). Scotland: Berwicks. (Burnmouth); Haddington (Dunbar); Edinburgh (Joppa); Fife (Elie, Earlsferry); Forfar (Arbroath); Kincardine (Stonehaven); Orkney (Kirkwall). Common on the shores of Scotland and Northern England.

Gen. 241. Cruoria Fries.

C. pellita Lyngb. Coasts of Cornwall (Penzance, St. Michael's Mount, Pridmouth); Northumberland (Berwick). Scotland: Argyle (Loch Goil); Renfrew (Wemyss Bay); Bute (Cumbrae); Ayr (Saltcoats). Rather rare.

C. adhærens J. Ag. Coasts of Northumberland (Newbiggen, Tynemouth, Berwick); Aberdeen (Peterhead, Aberdeen); Dumbarton (Kilcreggan); Antrim (Cushendall); Clare (Kilkee). Not uncommon.

C. rosea Crn. (= *C. stilla* Kuck.). Coast of Devon (Plymouth, Wembury). Very rare, and only obtained by dredging. — Var. β *purpurea* Batt. (= *C. purpurea* Crn.). Devon (Wembury). Very rare.

Tribe Squamarieæ Schm.

Gen. 242. Cruoriopsis Zan.

C. Hauckii Batt. Coast of Devon (Plymouth). Very rare, and only obtained by dredging.

C. gracilis Batt. (= *Plagiospora gracilis* Kuck.; *Cruoriopsis cruciata* Zan.? Batt. in Journ. Bot. Sept. 1896). Coast of Devon (Plymouth). Very rare; only obtained by dredging.

Gen. 243. Cruoriella Crn.

C. Dubyi Schm. (= *Peyssonnelia Dubyi* Crn.). Coasts of Cornwall (Pridmouth, Plymouth); Devon (Torquay, Sidmouth); Essex (Blackwater Estuary); Yorks. (Scarborough); Northumberland (Berwick); Isle of Man. Scotland: Berwicks. (Burnmouth); Haddington (Dunbar); Forfar (Arbroath); Bute (Arran, Cumbrae, Bute). Ireland: Galway (Roundstone). Channel Islands (Alderney, Guernsey). Not uncommon.

Gen. 244. Peyssonnelia Dcne.

P. Rosenvingii Schm. Coasts of Cornwall, Devon (Plymouth, Sidmouth), Dorset (Chapman's Pool), and Northumberland (Berwick). Rare.

P. Harveyana Crn. Coasts of Cornwall (Mousehole, Penzance); Devon (Wembury); Northumberland (Berwick). Very rare.

P. rubra J. Ag. (= *P. Dubyi* Harv. pro parte). Coasts of Devon (Plymouth) and Galway (Birturbui Bay). Very rare; obtained only by dredging.

P. atropurpurea Crn. Coast of Cornwall (East Mousehole, Penzance, Scilly Islands). Channel Islands (Alderney). Very rare.

P. rupestris Crn. Coast of Devon (Plymouth). Very rare; obtained only by dredging.

Fam. Hildebrandtiaceæ Hauck.

Gen. 245. Hildenbrandtia Nardo.

H. prototypus Nardo. Common almost everywhere on the shores of the British Islands. — Var. *β rosea* Kütz. (= *H. rubra* Harv.). Common.

H. Crouani J. Ag. (= *H. rosea* Crn., non Kütz.). Coasts of Devon (Teignmouth) and Northumberland (Berwick). Rare.

Fam. Corallinaceæ Schm.

Gen. 246. Schmitziella Born. & Batt.

S. endophlæa Born. & Batt. Coast of Devon (Torquay); Isle of Man. Wales (Bangor, Anglesea). Ireland: Cork (Calf Island); Dublin (Dalky Sound); Clare (Kilkee and Farrihy Bay). Probably not uncommon.

Gen. 247. Choreonema Schm.

C. Thureti Schm. (= *Melobesia Thureti* Born.). Coasts of Cornwall (Lizard); Devon (Sidmouth); Dorset (Swanage); Hants (Isle of Wight); Sussex (Brighton, Worthing). Ireland: Galway (Roundstone). Not uncommon on the south coast of England, and said to be found all round the Irish coast.

Gen. 248. Melobesia Foslie.

M. farinosa Lam. Not uncommon on the coasts of the British Islands.

M. Callithamnioides Falk., non Crn. Coasts of Devon (Plymouth, Torquay); Dorset (Weymouth).

M. Lejolisii Rosen. Coasts of Cornwall (Falmouth); Devon (Plymouth); Dorset (Swanage); Galway (Roundstone); Cork (Bantry Bay).

M. corallinæ Solms. Coasts of Cornwall (St. Minver, Lizard, Looe, Fowey); Devon (Plymouth, Torquay, Sidmouth); Dorset (Weymouth, Swanage); Essex (Harwich, Dovercourt); Northumberland (Berwick). Scotland: Haddington (Dunbar); Bute (Cumbrae); Ayr (Saltcoats). Ireland: Antrim (north side of Belfast Lough). Channel Islands. Not uncommon on the British coasts.

M. zonalis Fosl. (incl. *Hapalidium conferroides* Crn. et *M. myriocarpa* Crn.). Coasts of Devon (Plymouth); Dorset (Weymouth); Isle of Man; Northumberland (Berwick); Aberdeen (Peterhead); Orkney; Bute (Cumbrae). Ireland (Malahide, Dublin Bay). Not uncommon.

Gen. 249. Dermatolithon Fosl.

D. pustulatum Fosl. (= *Melobesia pustulata* Lam. et *M. verrucata* Lam.). Not uncommon on the coasts of the British Islands.

D. macrocarpum Fosl. f. *Laminariæ* Fosl. (= *Melobesia Laminariæ* Crn.). Coasts of Cornwall, Devon, Dorset, Yorks., Northumberland, Haddington, Fife, Forfar, Bute, Ayr, Waterford. Not uncommon.

D. hapalidioides Fosl. (= *Melobesia hapalidioides* Crn. et *M. confinis* Johnst. Irish Nat. 1896?). Coasts of Cornwall (Boscastle); Devon (Torbay, Sidmouth); Northumberland (Berwick); and Ireland? Not uncommon.

D. adplicatum Fosl. Coast of Sussex (Bognor).

Gen. 250. Lithophyllum Fosl.

L. racemus Fosl. Coast of Devon (Falmouth) and west coast of Ireland.—Vars. *compressa* and *eunana* Foslie. West coast of Ireland.

L. dentatum Fosl. f. *Macallana* Fosl. Coast of Galway (Roundstone Bay).

L. incrustans Fosl. Common all round the British coasts.—Var. *Harveyi* Fosl. Common.

L. orbiculatum Fosl. South-west coast of Scotland (Kyles of Bute, Arran, Seamill).

L. Crouani Fosl. Coasts of Northumberland (Berwick) and Bute (Arran). Probably common.

Gen. 251. Lithothamnion Fosl.

L. glaciale Kjellm. (= *L. flabellatum* Batt., non Rosenv.). South-west coast of Scotland: Bute (Port Bannatyne).

L. colliculosum Fosl. and var. *rosea* Batt. Southern Scotland and Western Ireland. Not uncommon.

L. Battersii Fosl. Coast of Bute (Cumbrae).

L. calcareum Aresch. West coasts of England, Scotland, and Ireland.—Vars. *subsimplex* Fosl. and *compressa* Fosl. West of Ireland.

L. Sonderi Hauck. South-west coast of Scotland (Bute, Cumbrae), and east and west of Ireland.

L. lichenoides Fosl. (= *Melobesia lichenoides* Harv.). Coasts of Cornwall, Devon, Dorset, Hants, Isle of Man, west coast of Ireland, and Channel Islands. Rather rare. — Var. *agariciformis* Fosl. (= *Melobesia agariciformis* Harv.). West coast of Ireland (Roundstone).

L. Lenormandi Fosl. f. *typica* Fosl. Not uncommon on the British coasts. — Var. *sublævis* Fosl. Coast of Northumberland (Berwick).

L. Strömfeltii Fosl. "Common in Ireland," Johnston & Hensman.

L. membranaceum Fosl. Not uncommon on the British coasts.

L. corticiforme Fosl. (= *Melobesia corticiformis* Kütz. et *Hapalidium Hildenbrantioides* Crn.). Not uncommon.

Gen. 252. Clathromorphum Fosl.

C. circumscriptum Fosl. "West of Ireland," Johnston & Hensman.

Gen. 253. Phymatolithon Fosl.

P. polymorphum Fosl. (= *Melobesia polymorpha* Harv.). Not uncommon on the British coasts.

P. lævigatum Fosl. Coast of Northumberland (Berwick), and west coast of Ireland. Not common.

Gen. 254. Corallina Lamour.

C. officinalis L. Common almost everywhere on the British coasts. — Var. *β compacta* Batt. (= *C. compacta* Crn. Fl. Finst. p. 151). Coasts of Devon (Torquay, Sidmouth), and Dorset (Portland, Swanage). Rare.

C. elongata Johnst. Br. Spong. et Corall. e spec. auth. in Herb. Batt. (= *C. mediterranea* Aresch.). Coasts of Cornwall (Lizard, Falmouth, St. Michael's Mount, Pridmouth, Fowey). Ireland: Ballydonegan Bay, and Baltimore, Co. Cork. Channel Islands (Jersey). Rare.

C. squamata Ellis. Coasts of Cornwall (Mount's Bay, Lizard, Falmouth, Fowey); Devon (Plymouth, Paignton, Torquay, Sidmouth); Dorset (Swanage); Hants (Isle of Wight). Scotland: Bute (Arran); Ayr (Portincross). Ireland: Cork (Youghal); Clare (Malbay) ("Not uncommon all round the coast," Johnston & Hensman). Channel Islands. Not uncommon on the south coast of England and the Channel Islands.

C. virgata Zan. Coast of Northern Ireland: Bangor, Co. Down. Very rare.

C. rubens Ellis & Solan. (= *Jania rubens* Lam.). Coasts of Cornwall, Devon, Dorset, Hants, Sussex, Kent, Essex, Suffolk, Norfolk, Durham (Roker, Marsden), Northumberland (Whitley), Isle of Man. Wales (Anglesea). Scotland: Fife (Elie); Aberdeen (Peterhead); Orkney (Kirkwall); Argyle (Lismore); Bute (Cumbrae); Ayr (Saltcoats, Girvan, Ballantrae). Ireland: All round the coast. Channel Islands. Common on the southern shores of England, Ireland, and the Channel Islands; rarer in Scotland.— Var. *β corniculata* Hauck (= *Jania corniculata* Lamour.). Coasts of Cornwall (Falmouth, Looe, Fowey); Devon (Plymouth, Torquay, Sidmouth); Dorset (Weymouth); Sussex (Worthing, Brighton); Essex (Dovercourt). Not uncommon on the southern coasts of England, Ireland, and the Channel Islands.

Genera of Doubtful Affinity.

Gen. 255. Porphyrodiscus Batt.

P. simulans Batt. Coast of Northumberland (Berwick). Very rare.

Gen. 256. Hæmatocelis J. Ag.

H. rubens J. Ag. (= *Hæmatophlœa Crouani* Crn., non J. Ag.). Coasts of Cornwall (Trevone Bay, Penzance); Northumberland (Berwick). Very rare.

Gen. 257. Rhododermis Crn.

R. elegans Crn. Coasts of Cornwall (Scilly Islands); Devon (Plymouth, Wembury). — Var. *β polystromatica* Batt. Coasts of

Devon (Plymouth, Sidmouth); Dorset (Chapman's Pool); Sussex (Bognor); Northumberland (Berwick). Rare.

R. parasitica Batt. Coasts of Devon (Plymouth); Northumberland (Berwick); Haddington (Dunbar); Fife (Kincraig); Forfar (Arbroath). Ireland: Antrim coast. Common on the coasts of Scotland, Northern England, and Ireland.

Gen. 258. Rhodophysema Batt.

R. Georgii Batt. Coasts of Cornwall (Scilly Islands); Devon (Torquay); Dorset (Weymouth). Very rare.

Gen. 259. Erythrodermis Batt.

E. Alleni Batt. Coast of Devon (Plymouth). Very rare, and only obtained by dredging.

Excluded Species.

Waifs.

Cystoseira barbata Ag. *Sargassum bacciferum* Ag. *S. vulgare* Ag. *Dasya Mulleri* Ag. *Plocamium biserratum* Dickie. *Hypnæa musciformis* Lam. *Gelidium cartilagineum* Gaill. *Suhria vittata* J. Ag.

Doubtful Species.

Cladophora Gattyæ Harv. *Hæmatocelis fissurata* Crn. (= the basal disc of *Dumontia filiformis* Grev. ?).

Changes of Nomenclature.

Phæophila Floridearum Hauck = *P. dendroides* Batt.
Epicladia Flustræ Rke. = *Endoderma Flustræ* Batt.
Pogotrichum filiforme Rke. = *Litosiphon filiformis* Batt.
Desmotrichum balticum Kütz. = *Punctaria baltica* Batt.
Phycolapathum crispatum Kütz. = *Punctaria crispata* Batt.
Endodictyon infestians Grau. = *Streblonema infestians* Batt.
Ectocarpus virescens Thur. = *E. Mitchellæ* Harv.
Ascocyclus globosus Rke. = *Hecatonema globosum* Batt.
Myrionema Liechtensternii Hauck = *H. Liechtensternii* Batt.
Carpomitra Cabreræ Kütz. = *C. costata* Batt.
Saccorhiza bulbosa De la Pyl. = *S. polyschides* Batt.
Dictyopteris polypodioides Ag. = *D. membranacea* Batt.
Callithamnion lepadicola J. Ag. = *Erythrotrichia Welwitschii* Batt.
Chantransia trifila Buffh. = *Acrochætium trifilum* Batt.
Chantransia corymbifera Thur. = *Acrochætium corymbiferum* Batt.
Nemalion lubricum Duby = *N. elminthoides* Batt.
Gigartina mamillosa J. Ag. = *G. stellata* Batt.
Phyllophora rubens Grev. = *P. epiphylla* Batt.
Cystoclonium purpurascens Kütz. = *C. purpureum* Batt.
Catenella Opuntia Grev. = *C. repens* Batt.
Calliblepharis Jubata Kütz. = *C. lanceolata* Batt.
Chylocladia ovalis Hook. = *C. ovatus* Batt.
Nitophyllum laceratum Grev. = *N. ramosum* Batt.
Delesseria sinuosa Lam. = *Phycodrys rubens* Batt.
Halopithys pinastroides Kütz. = *H. incurvus* Batt.

Polysiphonia atrorubescens Grev. = *P. nigra* Batt.
Dasya coccinea Ag. = *Heterosiphonia plumosa* Batt.
Griffithsia corallina Ag. = *G. corallinoides* Batt.
Griffithsia setacea Ag. = *G. flosculosa* Batt.
Callithamnion hormocarpum Holm. = *Seirospora hormocarpa* Batt.
Dumontia filiformis Grev. = *D. incrassata* Lam.
Dudresnaya coccinea Crn. = *D. verticillata* Le Jol.
Corallina mediterranea Aresch. = *C. elongata* Johnst.

LIST OF GENERA.

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ERRATA.

P. 25, line 17 trom top, for "Phæospora," read "phlœospora."
P. 72, line 6 from top, for "Flor. Ital. p. 55," read "Florid. Ital. ii. p. 55."

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